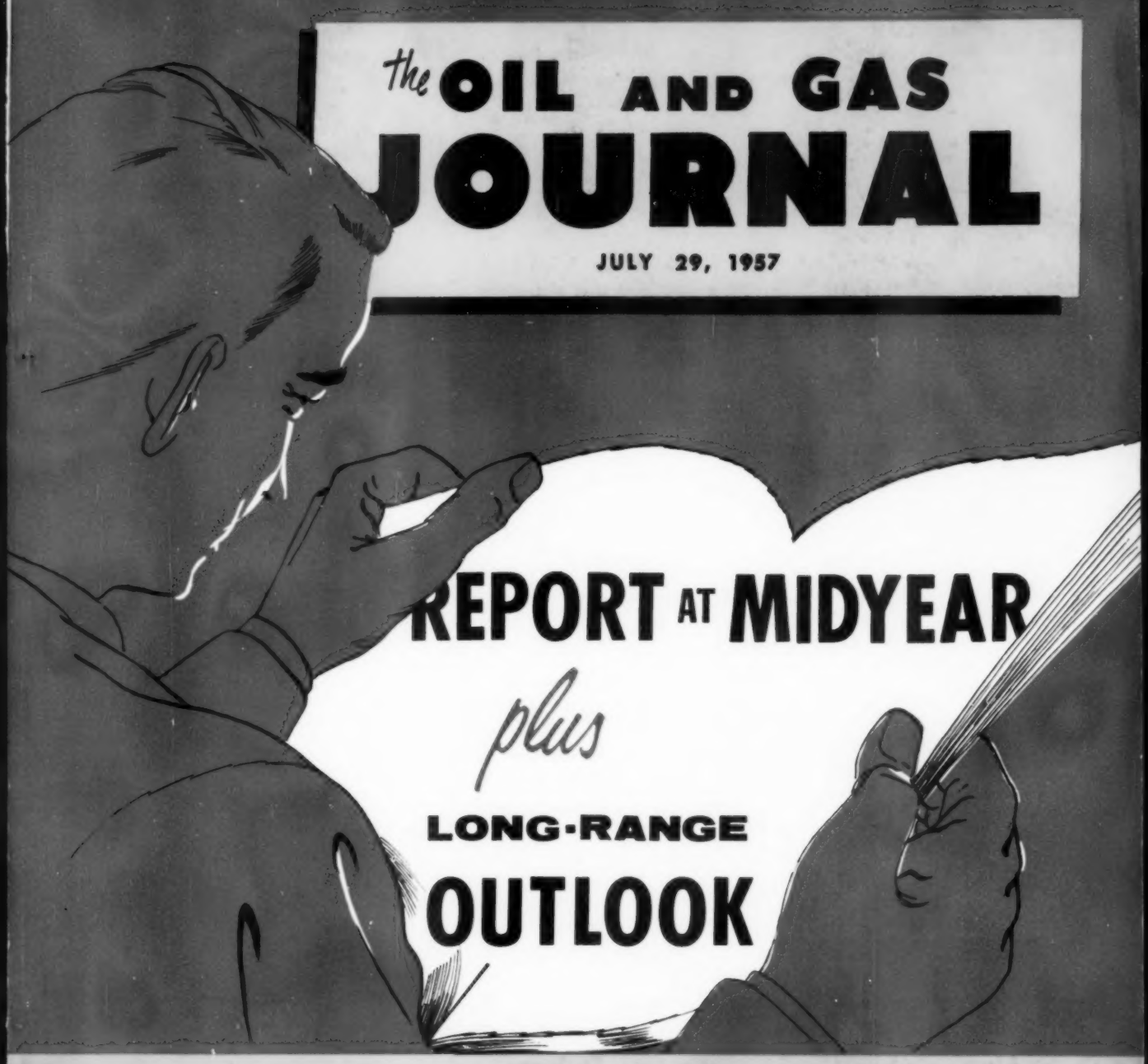
the OIL AND GAS JOURNAL

JULY 29, 1957



REPORT AT MIDYEAR

plus

LONG-RANGE OUTLOOK

L.P.G. Stocks: highest in history and rising p. 105

Natural Gas: 80 per cent is yet to be found p. 110

WHO'D PAY $19,000 TO SHIP 17 VALVES?

. . . *You* would, *if* these valves were about your only chance of saving a wild, rampaging oil well—potentially worth millions. This was the case recently when a well went wild in the Middle East. The original valves and fittings on the well-head couldn't take the abrasion and pressures to 4,500 psi. Quickly, the orders went out . . . "get us Rockwell-Nordstrom valves and get them *fast!*" Within three days, the valves were whisked overseas on a chartered DC-4. The expense was well justified—*the Rockwell-Nordstrom valves did the job.*

Sometimes it takes the unusual to clearly point up what many oil field men have known for more than forty years . . . *you can't buy a better well head valve than Rockwell-Nordstrom.* Their combination of *continuous* lubricant seal and *unexposed* seating have proved to be the best way to hold high pressures and abrasion that eat the heart right out of ordinary valves.

Rockwell-Nordstrom oil field production valves are available in a full range of sizes and pressures for every need. For complete information, see your nearest supplier or write: Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

ROCKWELL-Nordstrom VALVES

Lubricant Sealed For Positive Shut-off

JOURNAL News Letter

July 29, 1957
Tulsa. Okla.

Oil industry is still expanding despite rugged first half:

That's the general story found by The Journal's midyear review.

Demand was up 5.9 per cent due to exports in Suez crisis. Domestic demand was only up 1.1 per cent.

Production of crude hit 7,525,000 bbl. daily, up 5 per cent. It will show a drop, however, in second half.

Drilling took the worst beating. Only 25,761 wells were completed, a drop of 3,077 from same 1956 period. Companies plan 29,673 wells in last half for a year's total of 55,434, down 2,726 from 1956.

Footages offset this some. Wells are getting deeper. Average well depth was 4,182 ft. in first half compared to 4,022 ft. in 1956.

Refinery runs averaged 8,007,000 bbl. daily, a 1.1 per cent gain. Refiners kept octanes well above new-car requirements, but their surplus stocks resulted in soft products markets.

Pipeliners can expect to build 14,000 miles of gas lines, 5,500 miles of oil, and 3,000 miles of products lines this year.

Imports, due to Suez, were down to 808,000 bbl. daily but are heading to 1,260,000 bbl. daily for last half unless controls are imposed.

What's the long-term outlook? Plenty of growth in next 8 years but percentage gains may not be as impressive:

Demand--10,600,000 bbl. daily domestically by 1960 and 13,250,000 by 1965. Gas will be 13.26 trillion cubic feet in 1960 and 16.32 trillion cubic feet 5 years later.

Production--9,000,000 bbl. daily by 1960 and 10,000,000 in 1965.

Drilling--82,300 wells in 1965 to find 5.7 billion barrels needed.

Refining--11,200,000 bbl. daily of crude run to stills.

Pipelines--Four major gas lines a year. Pipelining of products will reach 51 per cent of their demand by 1965.

Some financial trends for oil are being noted by analysts:

...Profit margins are getting smaller. Integrated oil companies 6 years ago carried 8.6 per cent of gross income to net profit. It slipped to 7 per cent last year.

...Capital spending is growing faster than earnings. This spending was 83 per cent of earnings 6 years ago and 104 per cent now.

West Coast oil men aren't too excited about reports of major oil strike in the state of Washington.

Actual test information is scarce on the wildcat, the 1 Madina of Sunshine Mining Co. and J. W. Tanner. Sunshine reported well flowed at rate of 400 bbl. daily of 48°-gravity oil on drill-stem test at 3,940-63 ft.

Operator drilled to 4,130 ft. last week and then halted to run 5-1/2-in. casing and an electric log. All scouts were kept away.

The 1 Madina is a northerly offset to the Fawksworth test and northwest offset to Union 3 state, both of which showed as producers for a while.

Richfield may have a big discovery in Alaska.

Wildcat on the Kenai National Moose Range flowed at rate of 200 bbl. daily of 31°-gravity crude on formation test at 11,140-70 ft. Operator is drilling ahead.

Richfield owns 89-1/2 per cent of the 71,680-acre unit. Other owners are Union Oil and Ohio Oil. Standard of California also is a big lease holder in the Kenai Peninsula.

Confidential reports from Venezuela reveal interesting ups-and-downs on drilling activity in Lake Maracaibo.

Second Sun Oil well isn't very promising so far. But unlike the first test it may make a small well. Operator is drilling on down and may go into the basement.

Signal is starting a second test. First was abandoned.

Creole's CL-1 is a corker, officially rated as a new-field discovery. Formation tests in different spots between 11,000 and 12,000 ft. each made about 700 bbl. daily. And each interval was perforated only 5-10 ft.

Superior evidently has hit the jackpot on its small concession. First test, Lama-1, logged 257 ft. of oil sand and 30 ft. silty sand. At last reports it was drilling ahead at about 8,000 ft. and still in oil sand. Firm's second well also is showing good.

North Africa looms larger as a great oil province:

Sahara strikes are leading French to talk hopefully of oil independence within 3 years.

Algeria's Hassi Messauod field alone has a conservative 700 million barrels of reserves, they say. But the price of getting the oil will come high: Over a billion dollars must be spent on drilling and building pipelines to Mediterranean.

Libyan reports, meanwhile, are making some companies wish they hadn't ignored the sandy desert of Fezzan when they scrambled for acreage a year ago.

Esso Standard of Libya already has found oil sands at 500, 900

and between 1,100 and 1,200 ft. in its first wildcat at Al Auenat near the Algerian border.

Drilling is now below 1,900 ft. No tests have been made of shows. But Libyan Petroleum Commission got so excited about the prospects they made the announcements.

Expect a rush now by companies to get Fezzan grants.

This will interest refiners:

Sinclair uses about 25 per cent less fuel per barrel of crude charged than the average for U. S. refiners.

This is the result of a 35-year program to keep its fuel costs low.

One of its top devices for saving heat is an air heater which recovers waste heat in flue gases and returns it to the furnace (P. 205).

The Texaco process for producing hydrogen from fuel oil has been proved successful in commercial operation by a French refiner (P. 203).

Synthetic rubber is taking more and more of U. S. market.

The oil-derived material supplied more than 63 per cent of U.S. rubber needs in May and June, a new high. Average this year to date is 62.7 per cent of market compared to 61 per cent last year.

The 1957 rubber market is estimated at $6 billion.

Two labor trends affecting oil:

...International Federation of Petroleum Workers once again will try to organize oil workers in the Middle East. Plans were laid at recent world congress in Rome.

...Split in ranks of unionized engineers is slowing down a drive to sign up scientitic and engineering employees. One group is trying to set up Engineers and Scientists Guild as rival to Engineers and Scientists of America.

Oil men are amused by press dispatches on the Middle East's newest political hotspot--Oman.

The area is described as "oil rich." But if anyone has found any oil in Oman he's keeping it a deep, dark secret.

Oil, however, may be a factor in the trouble there. British have moved in with troops and planes to help the Sultan of Muscat put down an internal rebellion of his tribesmen. An affiliate of British-dominated Iraq Petroleum Co. is carrying on an exploration program in Oman.

American and French interests also are concerned. Jersey Standard and Socony jointly own 23.75 per cent of I.P.C. along with the British and French.

The Shah of Iran is smarting at Iranian Senate's delay in passing the new enabling oil legislation.

He's using all his influence to speed a vote. Approval was expected in a week after the Majlis passed the bill. But senators are dragging their feet.

The Shah sees one outcome if the bill passes: His government-sponsored National Iranian Oil Co. could become a world leader under its provisions.

El Paso Natural has sewed up all the gas reserves of Savanna Creek field in southwestern Alberta.

This resulted when Northern Natural joined Phillips Petroleum and Canadian Husky in signing contracts covering the big field.

Westcoast Transmission, owned 25 per cent by El Paso, plans a 30-in. line from Savanna Creek to the affiliated Pacific Northwest system on the Idaho-British Columbia border next year.

Texas Eastern is stepping up its drive to line up shippers for its Little Inch line.

The 185,000-bbl. daily carrier will revert from gas to products in September.

The company entertained 40 or 50 representatives of potential shippers at French Lick, Inc., recently. The purpose: Get them all together for a briefing on operations of the 20 in. line from Baytown, Tex., to Moundsville, W. Va.

Economists think the L. P. C. industry will ride out the present trouble of record-high stocks in the middle of the summer.

They predict relief from:

...A pickup in demand from late summer home selling, heavier farm sales due to hot weather, and greater volumes going to miscible-phase displacement projects.

...Increased underground storage which will allow the industry to carry a heavier inventory to be worked off this winter.

Researchers are shedding new light on the structure of crude oil.

Studies made by B. Roger Ray and fellow workers at the University of Illinois apparently show oil is a heterogeneous colloidal system. They separated petroleum samples into distinct phases in an ultracentrifuge.

Ray says petroleum crudes have colloidal particles in them. These are made up of clays, asphaltenes, and maltenes. On structure of oils, he says: They are micellar. Dense asphaltenes serve as nuclei. These are surrounded by less dense maltenes.

One thing to keep in mind if the Government wins its suit to unscramble the El Paso Natural-Pacific Northwest merger:

Both companies will be in the same fix they were in prior to the merger--El Paso needing more gas reserves and Pacific Northwest needing money to expand.

The suit apparently is an outgrowth of protests against the merger by the California attorney general. The government complaint filed in Salt Lake City is nearly identical to the California complaint.

B.F.Goodrich report:

Belts used to slip on this stop-and-go drive

B. F. Goodrich improvements in rubber brought extra savings

Problem: A breakdown of that V belt drive could cut off the natural gas supply to a large Midwest area. The drive is on an air compressor used to start huge engines that pump gas through a pipeline. Ordinary V belts couldn't take the stress of frequent starts and stops in around-the-clock service. They stretched, slipped, didn't deliver full power.

What was done: The problem was solved when they put on B.F.Goodrich Grommet V belts. Grommet belts stretch less—only ⅓ as much, on the average, as ordinary V belts. They are more flexible, can "give" temporarily and absorb the jolt of frequent motor starts.

Savings: B.F.Goodrich Grommet V belts cut costs because they last longer, keep running with fewer interruptions and reduce maintenance costs; yet they cost no more than ordinary belts. Here is what the manager of the pumping station has to say about the performance of these Grommet belts, "After two years of dependable service with B.F.Goodrich V belts, we sure will never take a chance on any other belt."

Where to buy: You'll find B.F.Goodrich V belts at leading supply stores in the oil field, or at any one of these B.F.Goodrich warehouses: Los Angeles, Great Bend, New Orleans, Shreveport, Hobbs, Oklahoma City, Tulsa, Corpus Christi, Dallas, Houston, Kilgore, Odessa, Wichita Falls. *B.F.Goodrich Industrial Products Co., Dept. M-108, Akron 18, Ohio.*

Grommet—T. M. The B.F.Goodrich Co.

B.F.Goodrich

INDUSTRIAL PRODUCTS

The OIL AND GAS JOURNAL

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EXPLORATION • DRILLING • PRODUCTION • FIELD PROCESSING

. . . an integrated magazine serving an integrated industry

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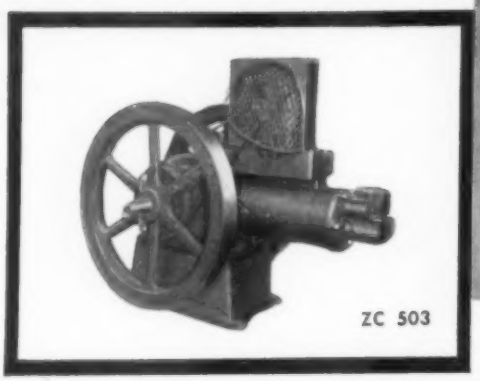
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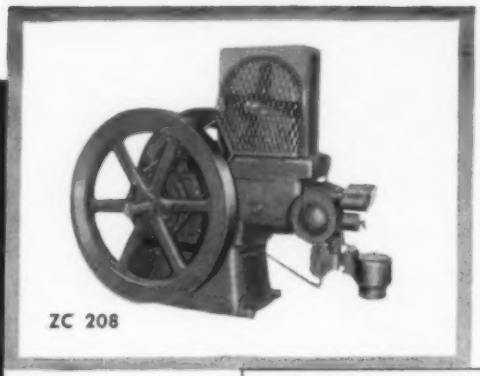
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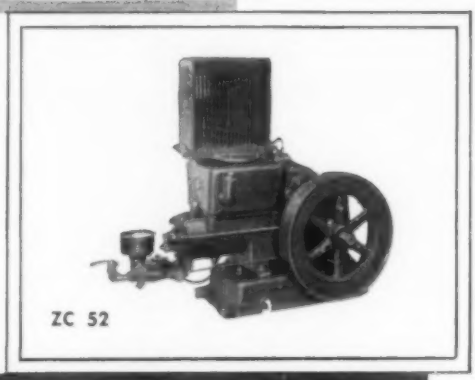
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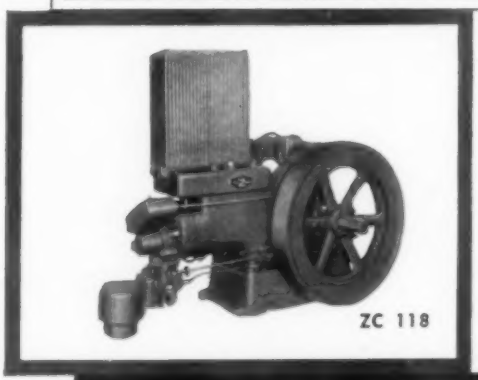
pick a "ZC" that best fits your pumping unit!

The broad Fairbanks-Morse "ZC" line has an engine that will best fit your pumping unit . . . from 3 to 30 hp. They're economical and easy to maintain—simply designed with no complicated parts or delicate adjustments.

All "ZC" sizes are high displacement, heavy-duty, slow-speed models—ideal for oil field pumping service! And, all sizes have the famous extra-heavy double flywheel for symmetry and perfect balance . . . with power take-off on either side of the engine.

See your local supply store about the "ZC" line . . . or write Fairbanks, Morse & Co., Chicago 5, Illinois.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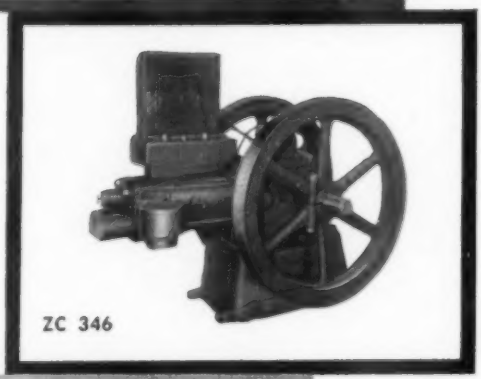
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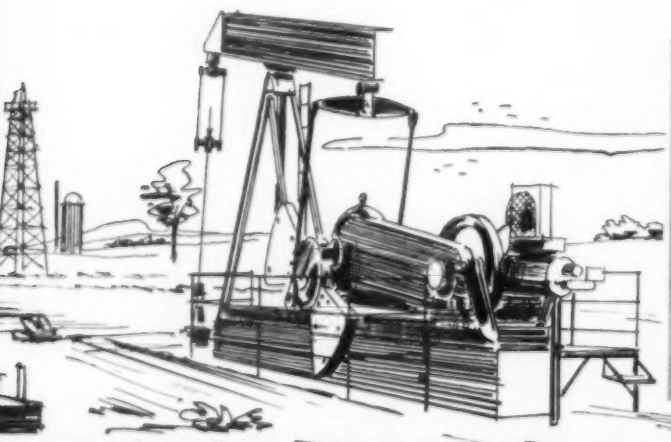

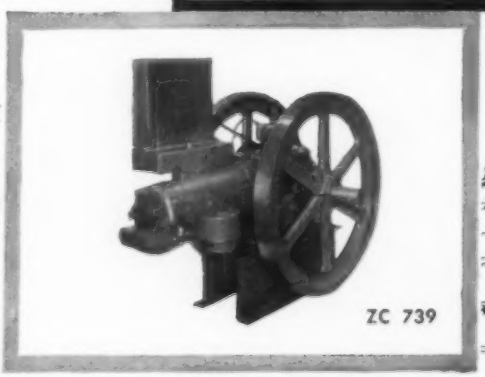
ZC 739

There is a difference in sucker rods

For over 65 years, the S. M. Jones Company has applied advanced *field research, engineering, and metallurgy to the manufacture of sucker rods.*

RESULTS: **Jones Sucker Rods** that are the standard of comparison because of their *proved* longer life.

"The S. M. Jones Company modern manufacturing plant, Toledo, Ohio"

THE S. M. JONES COMPANY

●

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Sales Office: Enterprise Building,
TULSA, OKLAHOMA
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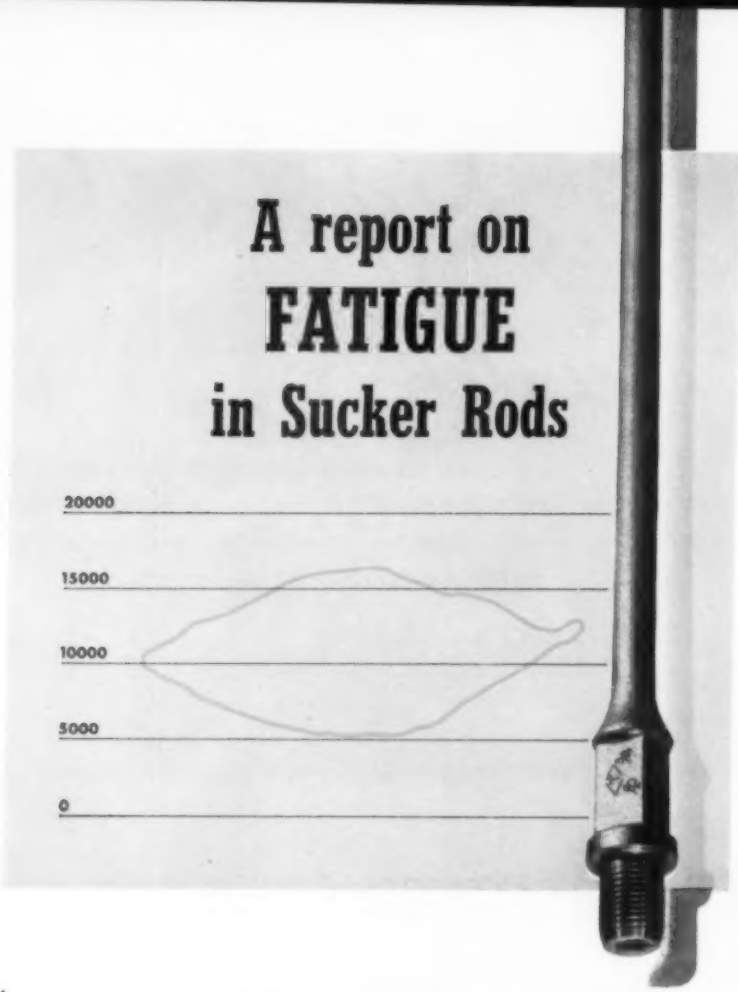
IDECO—Division of Dresser Equipment Company, Republic National Bank Building, Dallas, Texas, and
Chanin Building, New York City

6870

A report on FATIGUE in Sucker Rods



Although the degree of corrosion in any well environment is a primary factor causing fatigue, the purpose of this report is to identify, if possible, the cause of changes which occur to molecular structures when rod strings are subjected to excessive stress ranges, aside from corrosive action.

It is well known that any single stress that is less than the elastic limit can be applied to a string of sucker rods without establishing permanent stretch. However, lesser stresses repeatedly applied can cause breaks. The question is: Why?

When weighing a well with a dynamometer, *average* stresses are calculated—that is, the load divided by the cross-sectional area of the rods. Yet *service* stresses are actually higher at the rod skin, due to the physical factors, and since all breaks start at the rod surface, let's first consider *stresses at the surface.*

Stress #1 . . . is the surface stress at maximum tension from operational loads on the upstroke. Here we are lifting the rod string AND the oil.

Stress #2 . . . is the residual compression (a counteracting friendly stress) which can be built into quenched rods by *shot strengthening.* In reality, this is a booster which helps #3 as evaluated in the conclusions shown below.

Stress #3 . . . is the stress at the rod surface on the downstroke when the dynamometer reads lowest, and is frequently overlooked in considering well loadings as you will see in the following analysis.

The "net" stress severity on a sucker rod from the combination of the above three stresses is complex and is *not* calculable by simple addition and subtraction. Nevertheless, for illustrative purposes, we may grossly oversimplify to say . . .

- When rod ENDURANCE LIMIT is *greater* than #1 minus (#2 + #3), rods do not fatigue.
- When rod ENDURANCE LIMIT is *less* than #1 minus (#2 + #3), fatigue cracks will start.
- When fatigue cracks start, it is only a matter of time until rod failures will occur.

So ENDURANCE LIMIT becomes our concern. To make it as big as possible, "Oilwell" carefully liquid-quenches selected low carbon alloy steels . . . tempers to the hardness most favorable for rod endurance . . . and friendly stress #2 is added by our unique shot strengthening which compresses and hardens the surface as a bonus feature.

Of course you can delay fatigue action by (1) using subsurface pumps with the smallest bore that will get the desired production, (2) handling your rods with extreme care at all times so that bends or abrasions do not become the cause of surface cracks, and (3) standardizing on the size and grade rod that best meets your well condition.

All "Oilwell" rods are hot-straightened (to minimize residual stress associated with cold straightening), thoroughly degreased and coated with a baked phenolic plastic to protect surfaces from corrosion and abrasion before going into service, and carefully palletized on linseed oil-impregnated wood separators. Liquid quenching and shot blasting are provided on the rod grades which require these extra manufacturing steps to give you maximum performance.

The "Oilwell" Sucker Rod Comparison Chart gives detailed technical information on all leading brands of sucker rods. Send for one!

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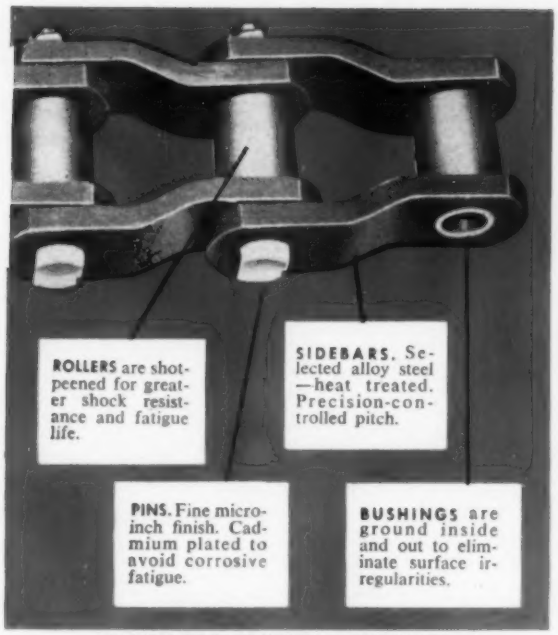
USS TRADE MARK

"OILWELL" TRADE MARK

UNITED STATES STEEL

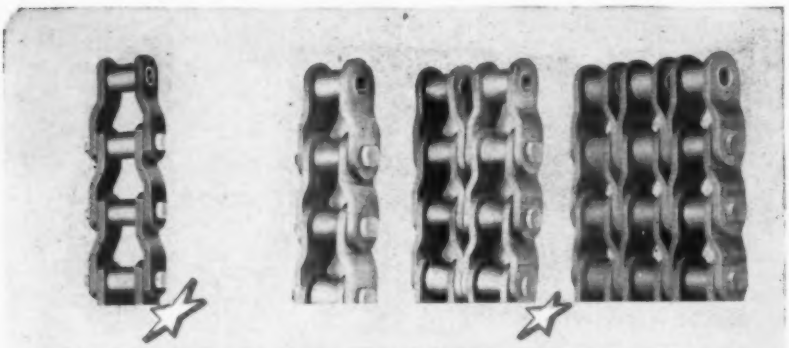

ROLLERS are shot-peened for greater shock resistance and fatigue life.
SIDEBARS. Selected alloy steel—heat treated. Precision-controlled pitch.
PINS. Fine micro-inch finish. Cadmium plated to avoid corrosive fatigue.
BUSHINGS are ground inside and out to eliminate surface irregularities.

FEATURES OF SS-40 HYPER, SS-3125 HYPER, SS-124 3-BAR HYPER, API-4 SUPER HYPER

Drilling deep or shallow--

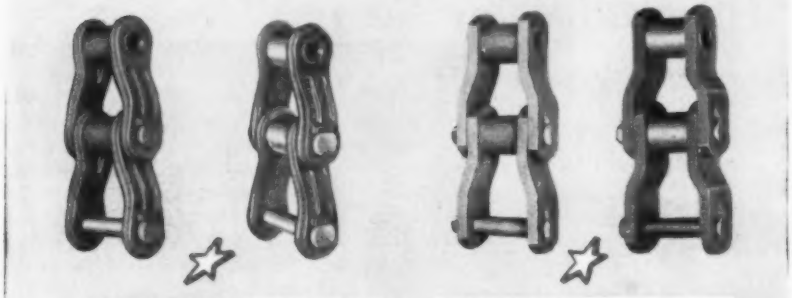
choose LINK-BELT API (SS type) chain

to get you there and back



SS-40 HYPER. Most widely used of all API rotary chains.

SS-3125 HYPER SINGLE, DOUBLE AND TRIPLE contribute unexcelled stamina to rotary, engine and hoisting drives.



SS-124 3-BAR HYPER AND SUPER HYPER are used for hoists and engine drives.

RED-HED chains answer need for good, durable, low-cost chain for shallow drilling.

Choose from the complete LINK-BELT line of API (SS type) chains . . . first choice in the field

Built and packaged for the toughest jobs . . . available at leading supply stores in the field

WHETHER it's hoisting or rotary service, deep or shallow drilling—Link-Belt has a chain for every need. More Link-Belt API chain is used than any other brand. That's because of features which have won acceptance from oil men everywhere. This chain is precision-manufactured—pitch holes and pitch are uniformly accurate . . . pins and bushings are ground to a fine micro-inch finish to eliminate fatigue-starting surface nicks.

Link-Belt API chains are double-boxed and steel banded—effectively protected from sand, grit and wet weather . . . easily identified. For the full story, get your copy of new Catalog 2680 from your Link-Belt office or supply store today.

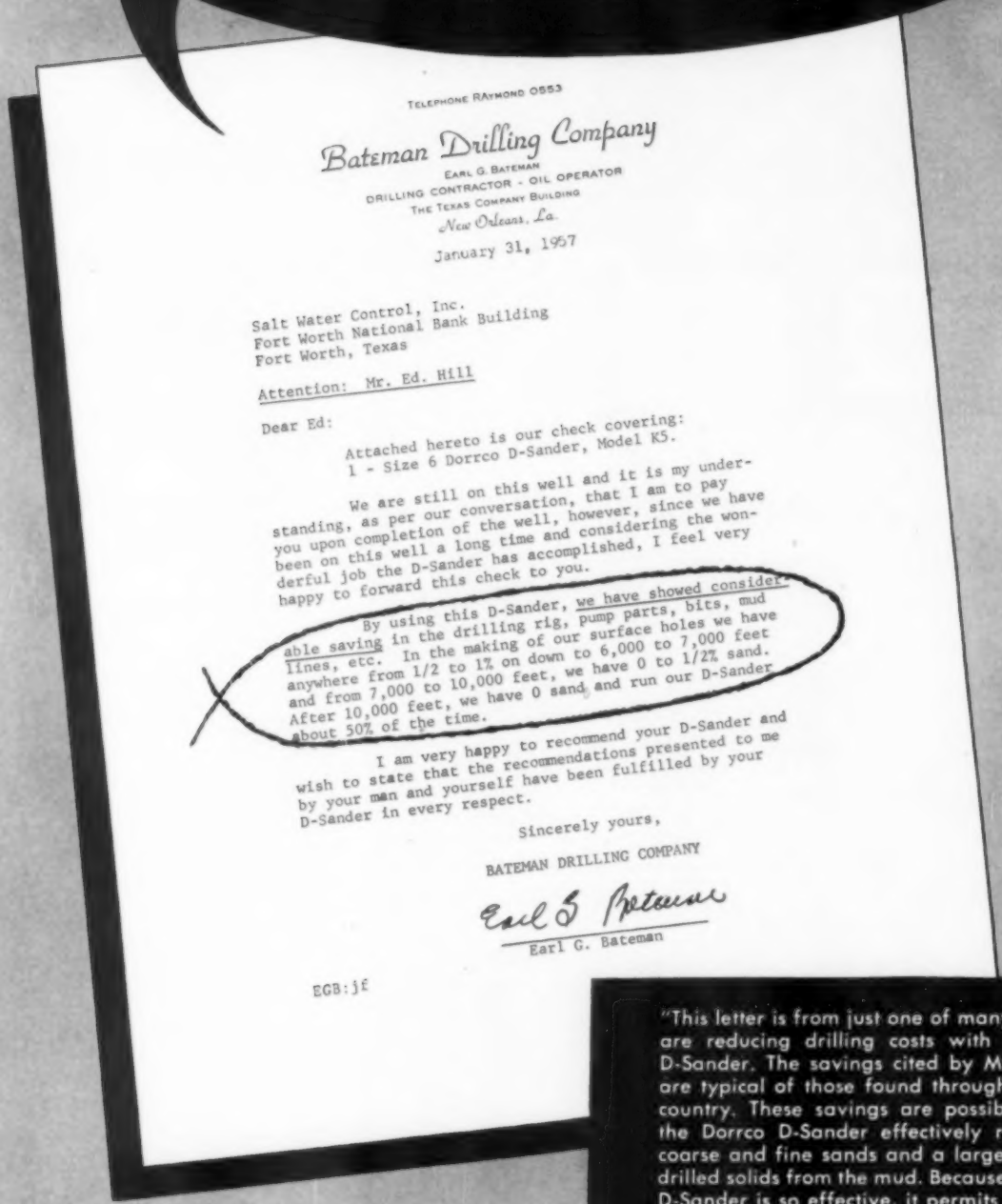
14,240

LINK-BELT

CHAINS and SPROCKETS

LINK-BELT COMPANY: Indianapolis 6, Houston 1, Dallas 21, Odessa, Tex., Shreveport, La., Los Angeles 33, Scarboro (Toronto 13); Export Office, New York 7. Distributors in All Fields.

"...we have showed considerable saving..."



TELEPHONE RAYMOND 0553

Bateman Drilling Company

EARL G. BATEMAN
DRILLING CONTRACTOR - OIL OPERATOR
THE TEXAS COMPANY BUILDING
New Orleans, La.

January 31, 1957

Salt Water Control, Inc.
Fort Worth National Bank Building
Fort Worth, Texas

Attention: Mr. Ed. Hill

Dear Ed:

Attached hereto is our check covering:
1 - Size 6 Dorrco D-Sander, Model K5.

We are still on this well and it is my understanding, as per our conversation, that I am to pay you upon completion of the well, however, since we have been on this well a long time and considering the wonderful job the D-Sander has accomplished, I feel very happy to forward this check to you.

By using this D-Sander, we have showed considerable saving in the drilling rig, pump parts, bits, mud lines, etc. In the making of our surface holes we have anywhere from 1/2 to 1% on down to 6,000 to 7,000 feet and from 7,000 to 10,000 feet, we have 0 to 1/2% sand. After 10,000 feet, we have 0 sand and run our D-Sander about 50% of the time.

I am very happy to recommend your D-Sander and wish to state that the recommendations presented to me by your man and yourself have been fulfilled by your D-Sander in every respect.

Sincerely yours,

BATEMAN DRILLING COMPANY

Earl G. Bateman

Earl G. Bateman

EGB:jf

"This letter is from just one of many users that are reducing drilling costs with the Dorrco D-Sander. The savings cited by Mr. Bateman are typical of those found throughout the oil country. These savings are possible because the Dorrco D-Sander effectively removes all coarse and fine sands and a large portion of drilled solids from the mud. Because the Dorrco D-Sander is so effective, it permits substantial savings in areas where normal sand and solids contents were formerly considered low. Contact Salt Water Control for more information and arrange for a trial on your own operations."

SWACO

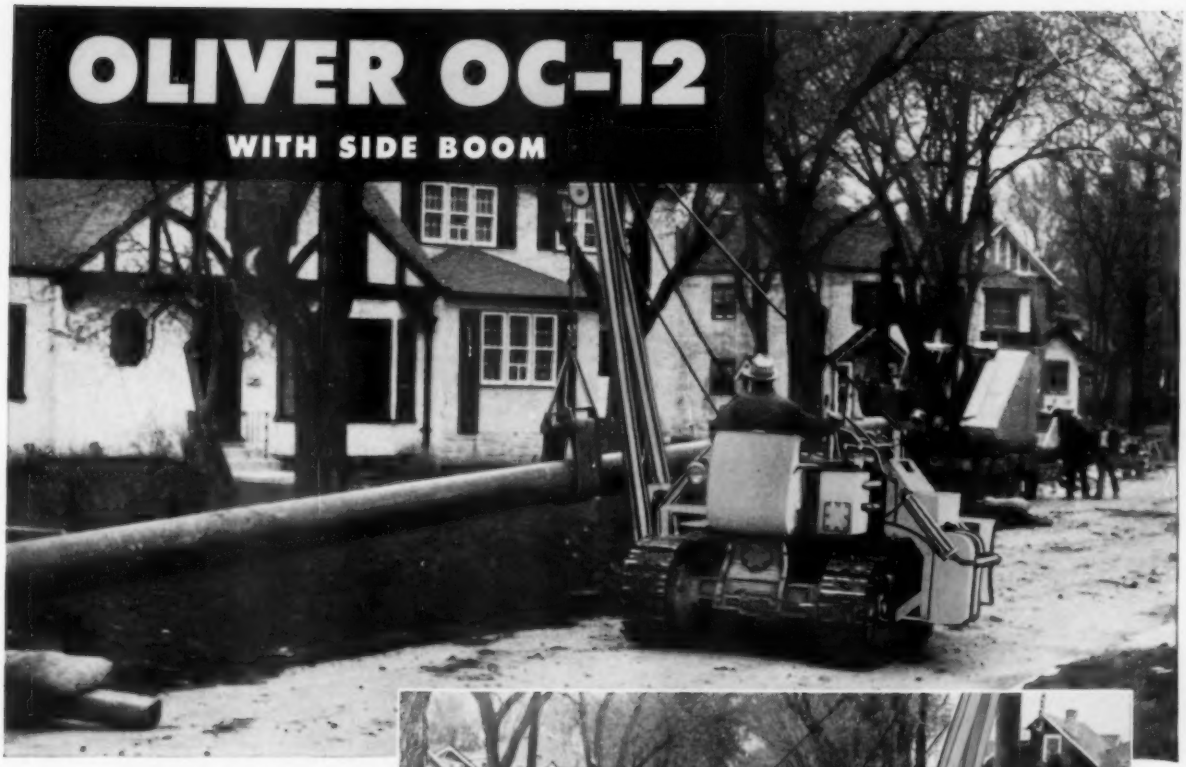
SALT WATER CONTROL Inc.

A Sid Richardson Development Company

1211 Ft. Worth National Bank Phone: ED 2-4434 Ft. Worth, Texas

OLIVER OC-12

WITH SIDE BOOM



POWER-TURN STEERING
speeds operations

"POWER-TURN gives us a big advantage on low-lying streets where a short turn is necessary—and where we still want power on both tracks. We like the low and high range of speed in the OC-12 and the flexibility of power."

"Most versatile machine on our large construction job"

On this big main line installation in Winnipeg, Manitoba, G. M. Gest Ltd., gas line contractor, regards the OC-12 with side boom as the most efficient all-around machine on the market.

The OC-12 serves four uses on this job: (1) unloading large parts, (2) carrying pipe long distances, (3) placing pipe in trenches, and (4) backfilling.

"Being able to backfill with a side boom tractor in such cramped areas speeds up our job materially," says Superintendent Russell Gates.

Easy maneuvering with Oliver's exclusive POWER-TURN gives production a big boost. POWER-TURN provides speeds ranging from 1.60 to 5½ m.p.h....a full 61 h.p....and the smoothest handling tractor you ever saw!

The Model OC-12 side boom has a lifting capacity of 13,000 lb. Only two simple controls are required for operating the hydraulic side boom and controlling cable speeds for fast, smooth handling.

Your Oliver distributor has full information about the OC-12 and other Oliver equipment used in pipeline, oil field and refinery work.

OLIVER **THE OLIVER CORPORATION**

400 West Madison Street, Chicago 6, Illinois

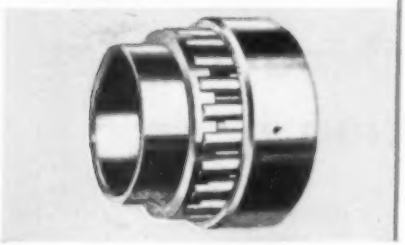
a complete line of industrial wheel and crawler tractors and matched allied equipment

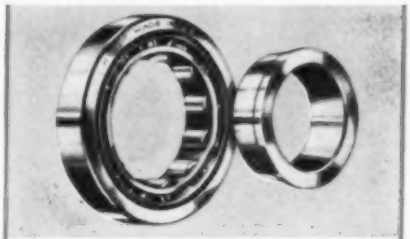
There's a HYATT HY-ROLL for every speed–

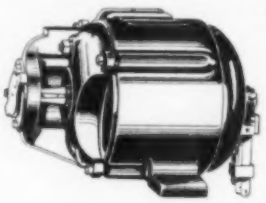
LOW

Industrial Inch Series
For speeds up to 600 rpm

Specifically designed for slow-moving, heavily loaded machinery where large diameter shafts are the rule. Available in fractional size bores for shafts from 4 inch diameter upwards.







MEDIUM

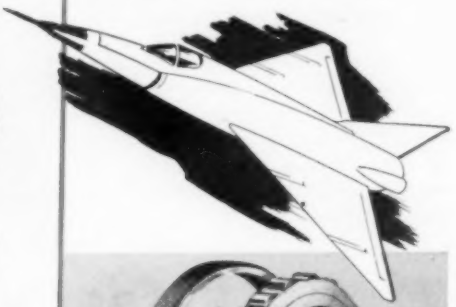
Hy-Load Series
For speeds up to 5,000 rpm

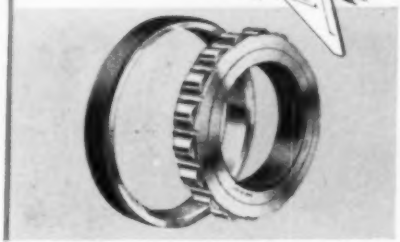
High-capacity cylindrical roller bearings for heavy radial loads and light or intermittent thrust loads. Available in a complete range of sizes and types.

HIGH

Aircraft Series
For speeds up to 50,000 rpm

Ultra-high-speed cylindrical roller bearings for jet engines and similar applications where rpm's are extremely high. Available in over 100 sizes and types.



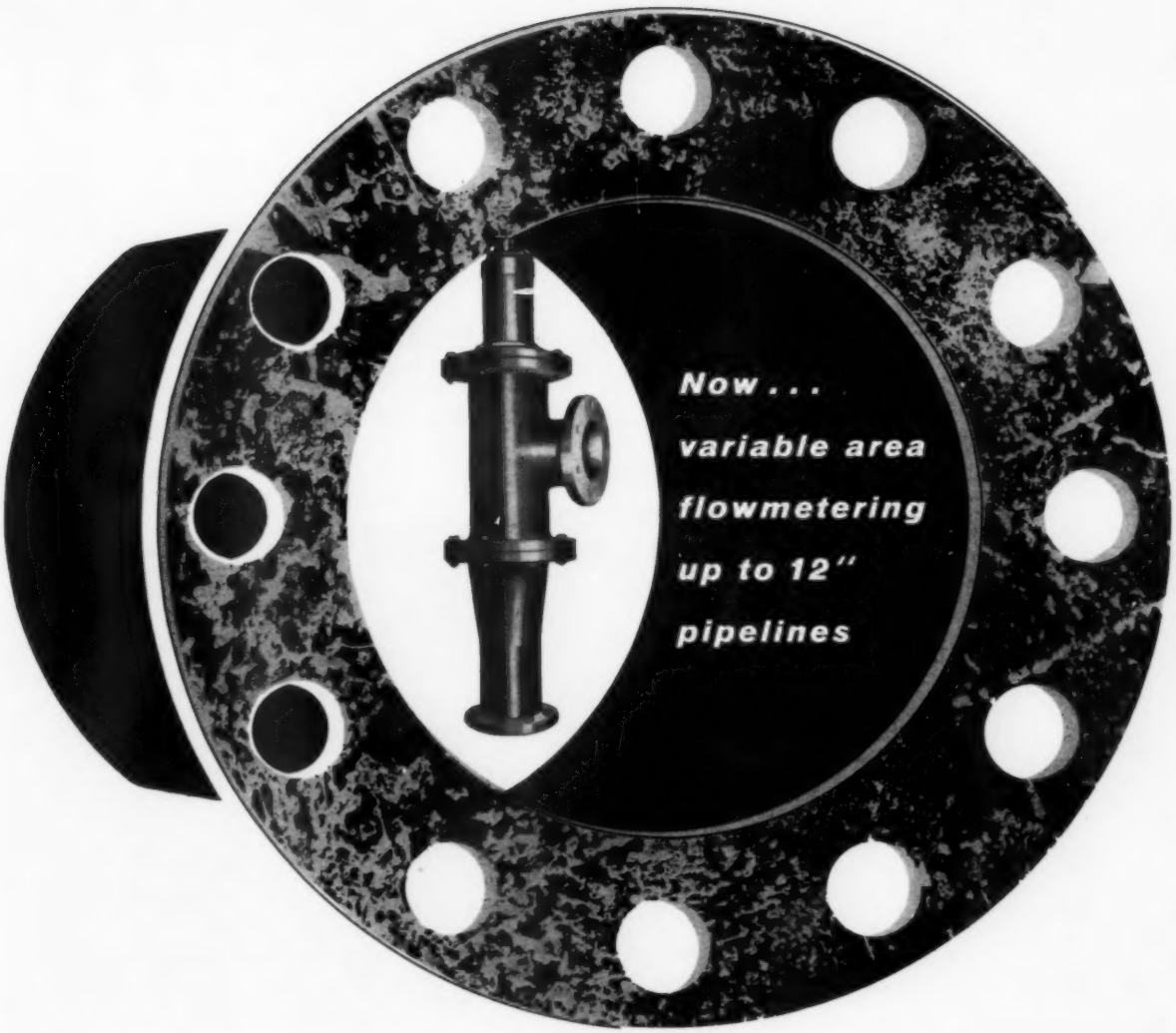


If you would like the technical assistance of an experienced sales engineer, phone or write Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey; Pittsburgh; Chicago; Detroit; Oakland, California.

FOR REPLACEMENT BEARINGS, SEE YOUR HYATT INDUSTRIAL BEARINGS DISTRIBUTOR

GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS
FOR MODERN INDUSTRY



The 844 makes conventional flowmetering old fashioned!

Fischer & Porter Figure 844 FLOWRATOR Meter gives you all the advantages of variable area flowmetering . . . plus high capacity . . . *without the shortcomings long associated with older type meters.*

Here's a sampling of what you get with the 844 FLOWRATOR Meter . . .

linear flow output — graduations are uniform, no square root calculations are necessary

all-metal construction — available in steel, stainless, and Hastelloy

wide metering range — accurately measures flows over 90%-95% of its operating range

low, uniform pressure loss — loss as low as 10" water column, remains constant over entire flow range

no straight run limitations — freedom from long, straight runs of pipe

self-cleaning action — fluid velocities and rising action of float keep meter clean and free from plugging

high repeatable accuracy — based on predictable performance principles supported by extensive laboratory flow data

mass flowmetering — can be made to read directly in mass flow rates

And there's more! For complete information on Figure 844, write for Catalog 10-A-43. Address request to Fischer & Porter Co., 3177 County Line Road, Hatboro, Pa. In Canada, write Fischer and Porter (Canada) Ltd., 2700 Jane St., Toronto, Ont.

FISCHER & PORTER CO.

Complete Process Instrumentation

in every case

GUARANTEED PERFORMANCE

met or exceeded

Here are only a few of the many plants designed and built by The Chemical & Industrial Corporation. They are all operating in excess of 340 days a year at their guaranteed, rated capacity and overall efficiency. C&I plants include complete facilities for the production of nitric acid, ammonium nitrate solutions and solids, complex fertilizer, phosphoric acid, and sulphuric acid.

Illustrated brochures on request

C&I THE CHEMICAL AND INDUSTRIAL CORP.

CINCINNATI 26, OHIO

Designers and Builders of Plants for the Processing of Ammonia
Available Throughout the World

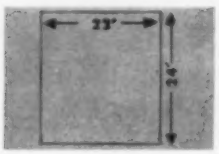
NEW! 98 and 132-ft. JUNIOR *Full-View Masts* by IDECO

Triangular cross-section columns have extra stability

Triangular design gives maximum resistance to damage in field handling. Compact nesting for economical moves.

Complete visibility makes round trips faster, safer

Driller has a "Full-View" of derrick man and traveling block, permitting faster hoisting and safer control.

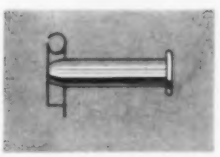


Roomy 22 x 24-ft. working floor clear of obstructions

Cathead areas are completely free of obstructions. Working floor is clear from drawworks to pipe ramp.

300,000 lbs. hook load capacity with eight lines

Complete strain gauge tests under maximum loaded conditions prove reserve strength of the Jr. Full-View.

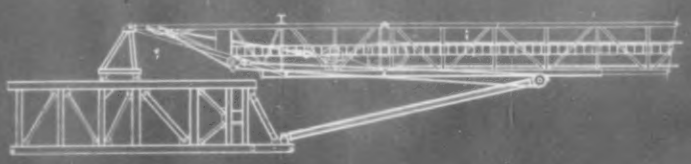


Pin connections throughout the mast and substructure

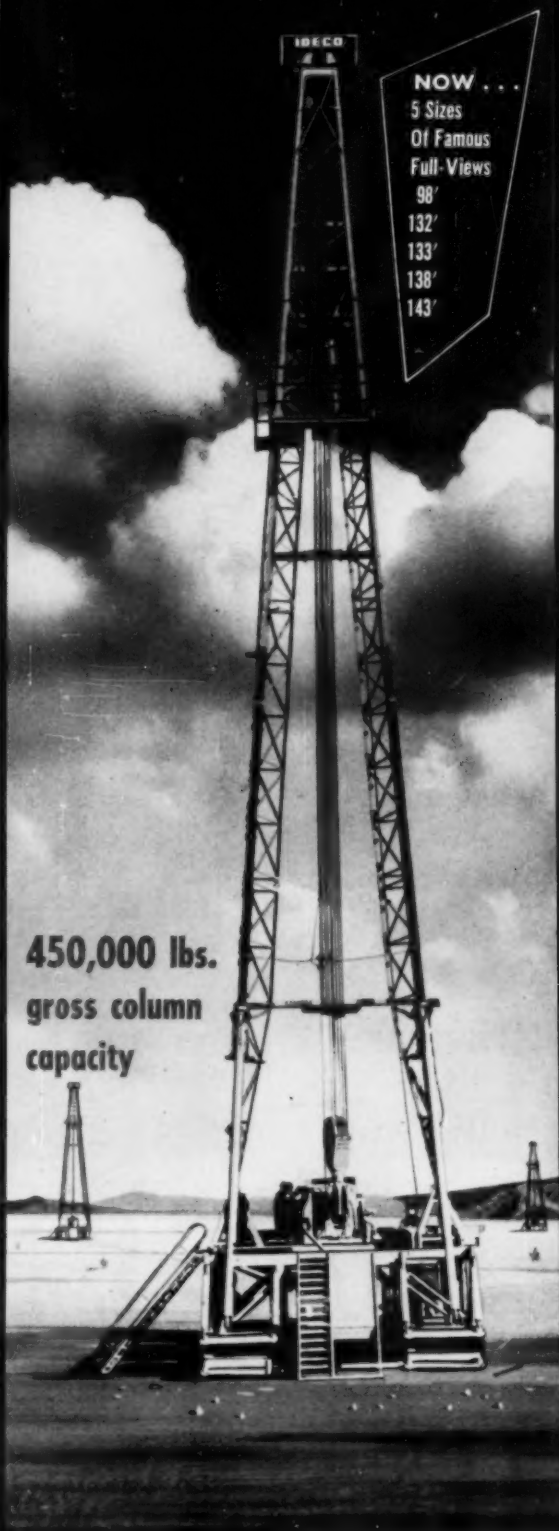
The entire structure is made up of road-size packages easily pin-connected. Portability is outstanding.

Easily change 98-foot mast to 132-foot or vice-versa

Merely by adding one section and reversing pedestals and base shoes a doubles mast becomes a trebles mast.



TIME-PROVED RAISING SYSTEM EMPLOYS RAISING LEGS WHICH LOCK IN POSITION AND BECOME STRUCTURAL MEMBERS OF MAST.



IDECO

P. O. BOX 1331 • DALLAS 21, TEXAS

When only the best will do . . . Use IDECO.

The details of supervision in field work are in the hands of experienced seismic craftsmen. Dewitt Lacy, senior observer, has been with Independent Exploration Company for 16 years.

A quarter century of

Experience means the finest blend of know-how and equipment

Obtaining and interpreting seismic data is a matter of skill and experience. In the company's quarter century of service to the oil industry, the personnel of Independent Exploration Company has acquired more than 1,661 man years of experience. Independent offers you the perfect blend of know-how and equipment. That means the best data possible from anywhere in the world. Next time, call in IX for a better job.

Pointing the way for the drill
IXC
25 YEARS 1932-1957

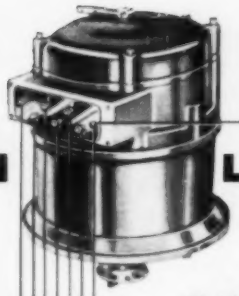
INDEPENDENT EXPLORATION CO.

Geophysical Surveys

1973 West Gray, Houston, Texas
1 Frederick's Place, Old Jewry, London, E.C.2, England
12 Rue Chabanais, Paris, France

OVER 1,661 MAN YEARS OF EXPERIENCE

A NEW HIGH IN LOW TENSION *Ignition*

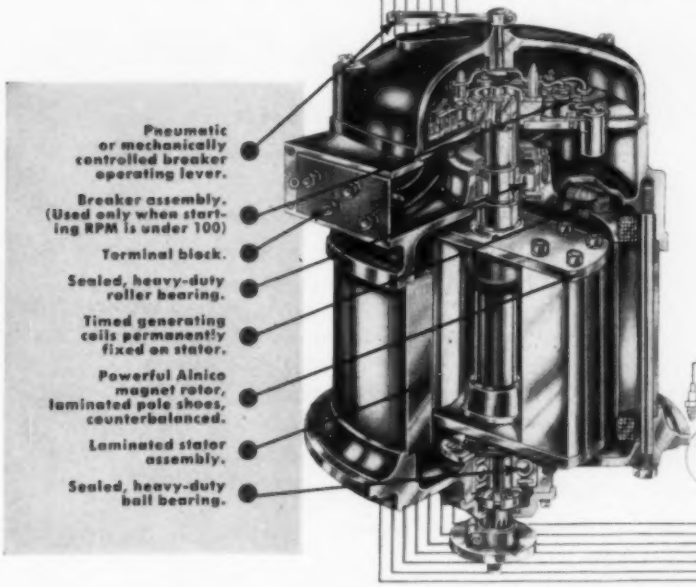


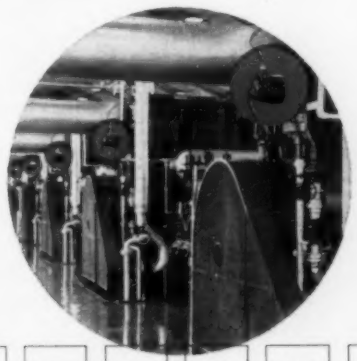
AMERICAN BOSCH
PULSE GENERATOR
for High Compression, Natural Gas Engines

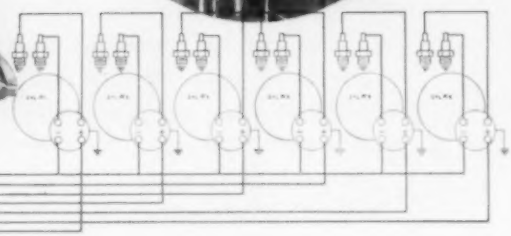
This great American Bosch Pulse Generator induces precisely timed, low voltage pulses which are fed thru ignition cables to high tension transformers at each engine cylinder. Here, the voltage is stepped up to required spark plug firing potential. Low tension distribution avoids capacitance build-up and energy losses, while minimizing fire and explosion hazards. The high voltage developed in the transformer secondary windings is more than enough to provide steadily reliable ignition for any high compression gas engine (in the present order of 250-400 psi, to all presently contemplated engines of far greater compression pressures).

Now you can have this greater capacity for long-term, trouble-free ignition, with higher KV output, plus low tension safety. Specify the MGC Pulse Generator System for *your* engines. American Bosch, Springfield 7, Mass. A Division of American Bosch Arma Corporation.

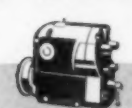
- NO DISTRIBUTOR, COMMUTATOR, SLIP RINGS OR BRUSHES TO SERVICE
- INDUCTOR ROTOR—ONLY MOVING PART
- PRECISE TIMING ACCURACY
- NEVER REQUIRES ADJUSTMENT
- LOW FIRE HAZARD—HIGH OUTPUT
- CONTINUOUS DUTY DESIGN


Pneumatic or mechanically controlled breaker operating lever.
Breaker assembly. (Used only when starting RPM is under 100)
Terminal block.
Sealed, heavy-duty roller bearing.
Timed generating coils permanently fixed on stator.
Powerful Alnico magnet rotor, laminated pole shoes, counterbalanced.
Laminated stator assembly.
Sealed, heavy-duty ball bearing.

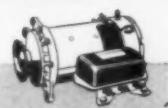




AMERICAN BOSCH



Automotive and Aviation Magnetos

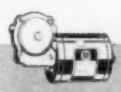


Generators and Regulators

Components for Aircraft Engines

AMERICAN AB BOSCH

Small Electric Motors



Electric Windshield Wipers

Diesel Fuel Injection Equipment

A highly trained laboratory force helps Halliburton cementers combat cement contamination. Additives used in drilling muds and cements are being evaluated here for slurry properties.

HALLIBURTON CEMENTING SERVICE

minimizes contamination...
permits maximum cementing benefits

Highly treated drilling muds are being used more than ever before in oil well drilling. While they serve an undeniably valuable service their increased use has been accompanied by a big increase in cement contamination problems.

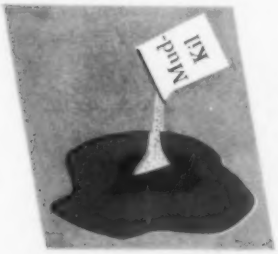
The possibility of cement contamination is reduced to the minimum when your well is cemented by Halliburton... when filter cake is more effectively removed with Halliburton Recipo Wall or Roto Wall Cleaners... when specially designed top and bottom cementing plugs reduce contamination on the interface between mud and cement. Improvements pioneered by Halliburton include the chemical additive, Mud-Kil, for decontamination of portland and Pozmix Cements.

For more successful primary or remedial cementing, call your nearby Halliburton representative.

HALLIBURTON
OIL WELL CEMENTING COMPANY
DUNCAN, OKLAHOMA

Field-Tested Weapons for Combatting Contamination

Halliburton has pioneered more successful methods and tools for fighting cement contamination . . . and successfully cemented more wells . . . than any other service company. Here are four Halliburton products that help make your cementing jobs more successful:



NEW DECONTAMINATION ADDITIVE . . .

● **MUD-KIL . . .** Neutralizes harmful contamination effects of quebracho and other tannins, starch, sodium carboxymethyl-cellulose and lignite. Mud-Kil does not adversely affect cement viscosity, setting time, or compressive strength.

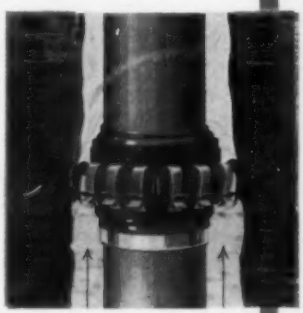
- Used in open-hole plug back jobs, liner jobs, squeeze cementing, tailing-out on primary casing jobs.
- Added to portland, Pozmix Cement or Pozmix 140 at bulk plant or in mixing water at location.

Now Halliburton offers a choice of two types of Wall Cleaners!

NEW DESIGN FOR RECIPROCATING CLEANER

● **HALLIBURTON NEW RECIPO WALL CLEANER . . .** Removes filter cake from wall of bore hole to allow better bonding of cement to formation and casing. The New Recipo Wall Cleaner offers these advantages:

- Flexible, tough rubber cleaning fingers minimize bore hole or filter cake damage while running casing, yet are sufficiently rugged to thoroughly clean wall when casing is reciprocated.
- Wide cleaning fingers clean broader area of bore hole wall. Aid in breaking up channeling of cement.
- Wider fluid passage areas between rubber cleaning fingers help reduce circulating pressures and bridging action of filter cake cuttings.
- Hinged type design permits fast, easy installation on casing.



Recipo Wall Cleaner

REMOVES MUD CAKE BY ROTATION OF CASING AT SURFACE

● **HALLIBURTON ROTO WALL CLEANER . . .** Used to remove mud cake from walls of the hole before cementing casing, thereby minimizing precautionary or remedial squeeze jobs. Roto Wall Cleaners have these advantages:

- Do not bridge off the annulus.
- Provide an open passageway for freeflow of fluids while running casing, circulating, cementing, etc.
- Reduce lost circulation problems as the mud cake through porous formations is undisturbed while running casing to bottom.

Roto Wall Cleaner

5-Wiper Plug-Top

5-Wiper Plug-Bottom

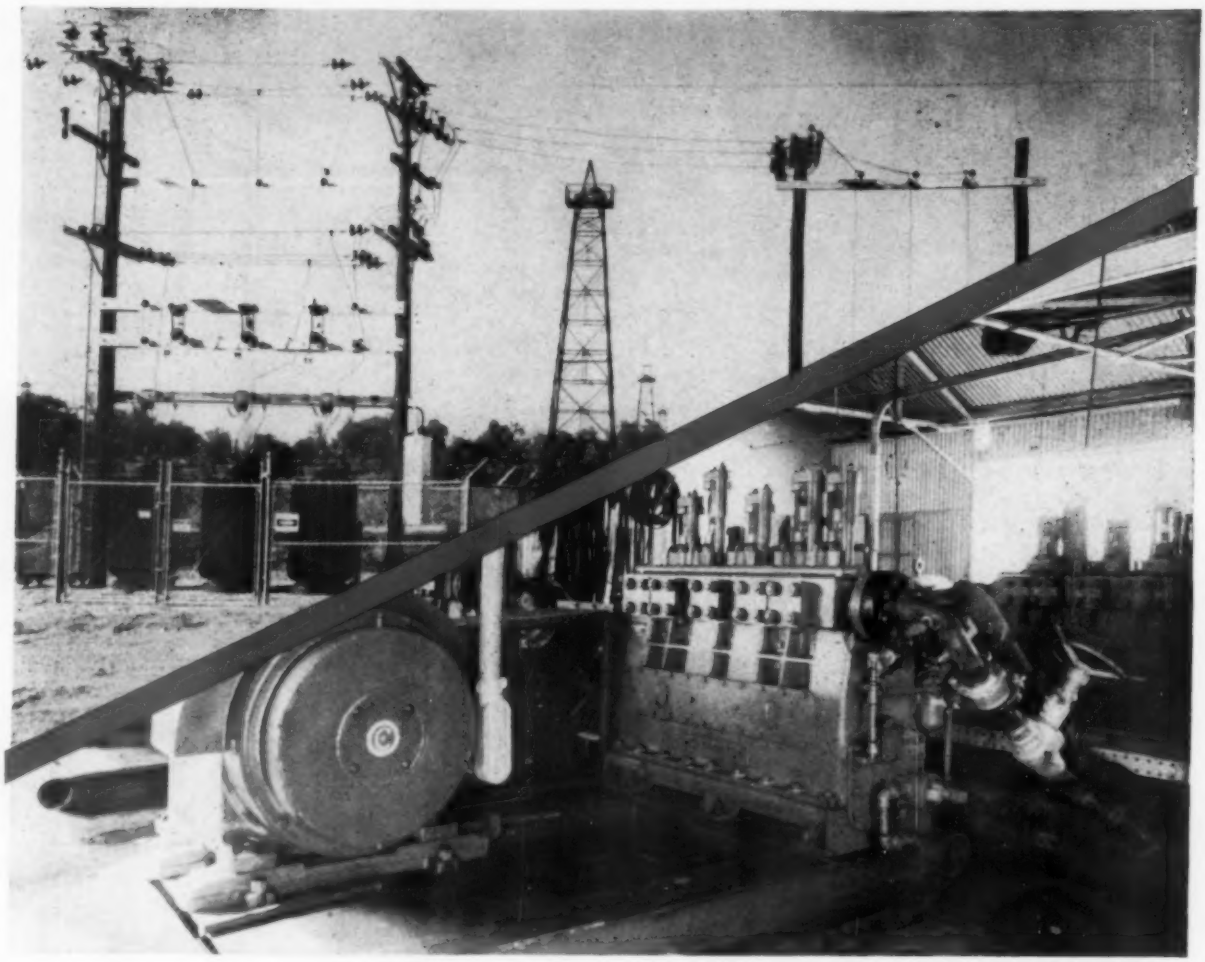
ANOTHER HALLIBURTON CEMENTING SERVICE "PLUS" . . .

● **HALLIBURTON CEMENTING PLUGS . . .** Type 5W Bottom Plugs wipe the pipe cleaner and help keep the drilling fluid and cement separated. Type 5W Top Plugs follow the cement and reduce channeling of displacement fluid through the cement. Halliburton plugs allow better placement of cement around the bottom of the casing where a good bond is required.

CEMENTING SERVICES

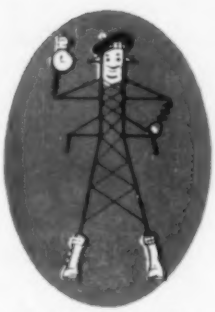
"A WELL WORTH CEMENTING . . . IS WORTH A HALLIBURTON CEMENTING JOB"

WATER FLOODING OPERATIONS ARE TURNING MORE AND MORE TO UTILITY ELECTRIC POWER



Progressive Management Finds the Solution

Are you doing water flooding? Do you have plans to do water flooding? If so, don't settle on the power equipment until you have carefully investigated what UTILITY ELECTRIC POWER can do for you. The sales engineer of your Utility Electric Power Company has many actual case records which demonstrate that it is more efficient . . . more economical to use Electric Power. Be modern . . . be progressive . . . enjoy all the benefits of truly automatic, push-button power – Use UTILITY ELECTRIC POWER.



I'm LCP – Low-Cost Power on the Job 24 Hours Daily

PETROLEUM ELECTRIC POWER ASSOCIATION

P. O. BOX 2771 DALLAS, TEXAS

There are always new stars in the SIE firmament

From the first SIE seismic instruments, the GA-7 through the GA-7H . . . to the first concepts in truly portable instrumentation which culminated in the P-11 Series . . . on to the G Series systems for magnetic and photographic recording . . . then the DRF Flow Control Systems and the MR group of field and portable magnetic recorders . . . continuous research and improvement have added new stars to the SIE firmament.

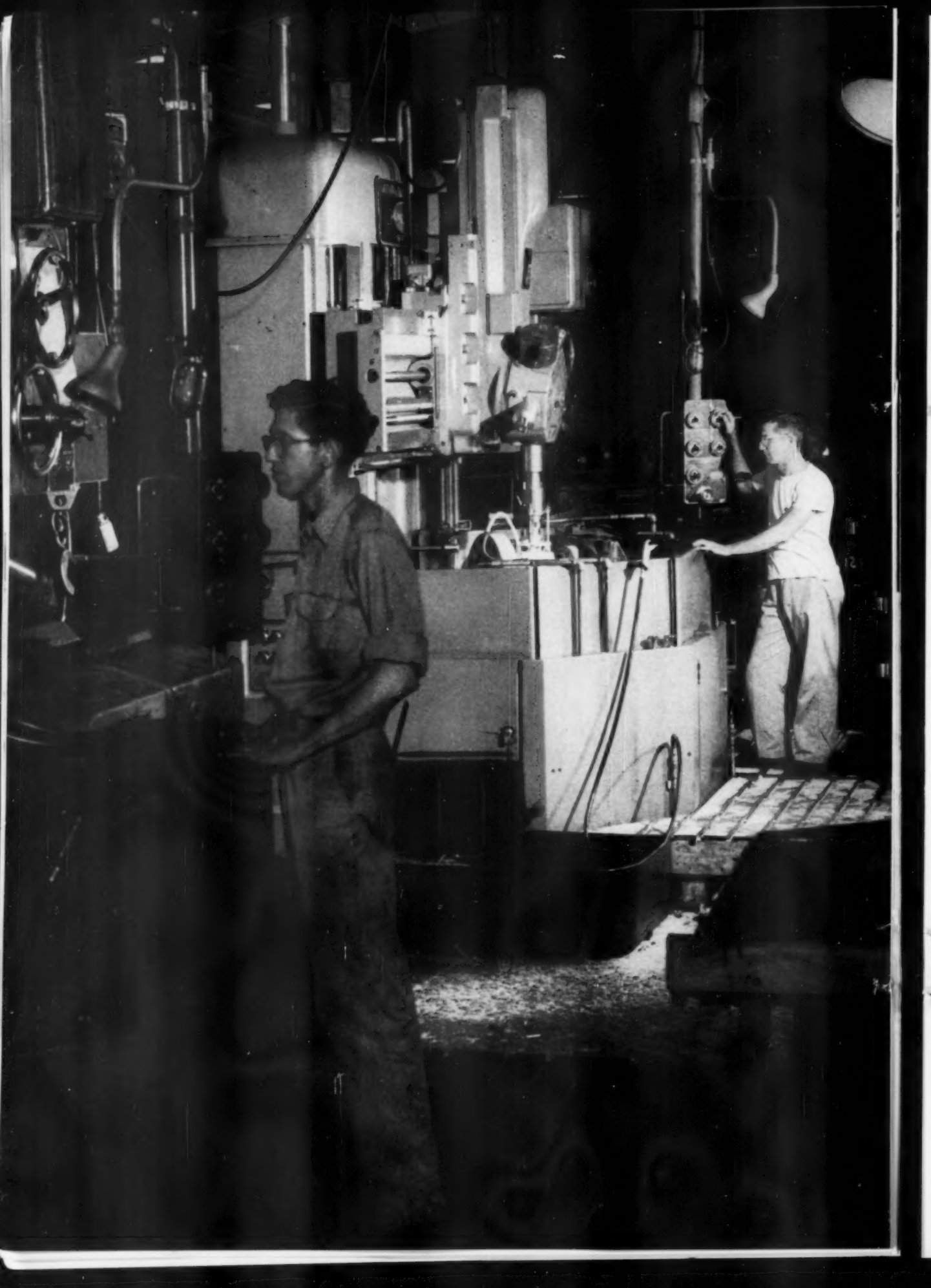
With the constant increase in SIE research and development activities for instrumentation and automation, you can expect added lustre in this galaxy every year.

SIE

Industrial Instrumentation for Industrial Progress

SOUTHWESTERN INDUSTRIAL ELECTRONICS COMPANY

2831 Post Oak Road • P. O. Box 13058 • Houston 19, Texas



Faster Than the Hand

There's not a single machine in the shop at the Oil Center Tool Company that thinks for itself.

The best engineers available, the best craftsmen available are paid well to do that.

But, some of the machines come pretty close to being self-contained "brains."

"Hand made" products no longer denote perfection. Uniformity, quality and specialization are better achieved on the automatics.

And if the future does yield a real robot for the machine shop, O-C-T will have it.

The most modern, the most efficient in tools, automatic and otherwise,—that's another reason for the supremacy of O-C-T products.

Precision, specialized well control equipment isn't turned out by hand . . . it's turned out with machines faster than the hand.

Oil Center Tool Company got along pretty well back in 1927 with one milling machine, a drill press, shaper and two engine lathes in an 18 x 20-foot shop.

Today, the company's plant occupies more than 55,000 square feet of floor space with all facilities covering 13½ acres. That's only temporary, of course. Expansion is always under way.

O-C-T machines, like O-C-T products, are specialized and versatile.

The little ones turn out big jobs and the big ones sometimes turn out little jobs.

O-C-T machines take raw, dull-looking hunks of iron and steel and convert them into gleaming pieces of well control equipment that can handle the toughest, the most complicated assignments.

For example, two recent additions to the machine shop cost about $100,000 each.

Their purpose?—Mass production that still imbues the product with an individual personality.

The units can be preset to do specific chores, automatically boring huge castings; boring vertically or at angles; boring tapered holes, holes the same size—all with super speed.

The nerve center of these robot giants is a complicated case of delicate electronic equipment.

In the midst of an automatic boring job, these machines can be halted, switched over to manual control to turn out an emergency job, and then placed back on its original work with no time lost in resetting controls.

Ultra modern machine shops is one reason why O-C-T continues to set production records.

But production records mean nothing unless the products are precision-made.

And the O-C-T formula of advanced machines plus skilled workers results in the precision needed . . . in volume . . . by the oil industry.

At O-C-T they can not use aged machines to be first in the machine age.

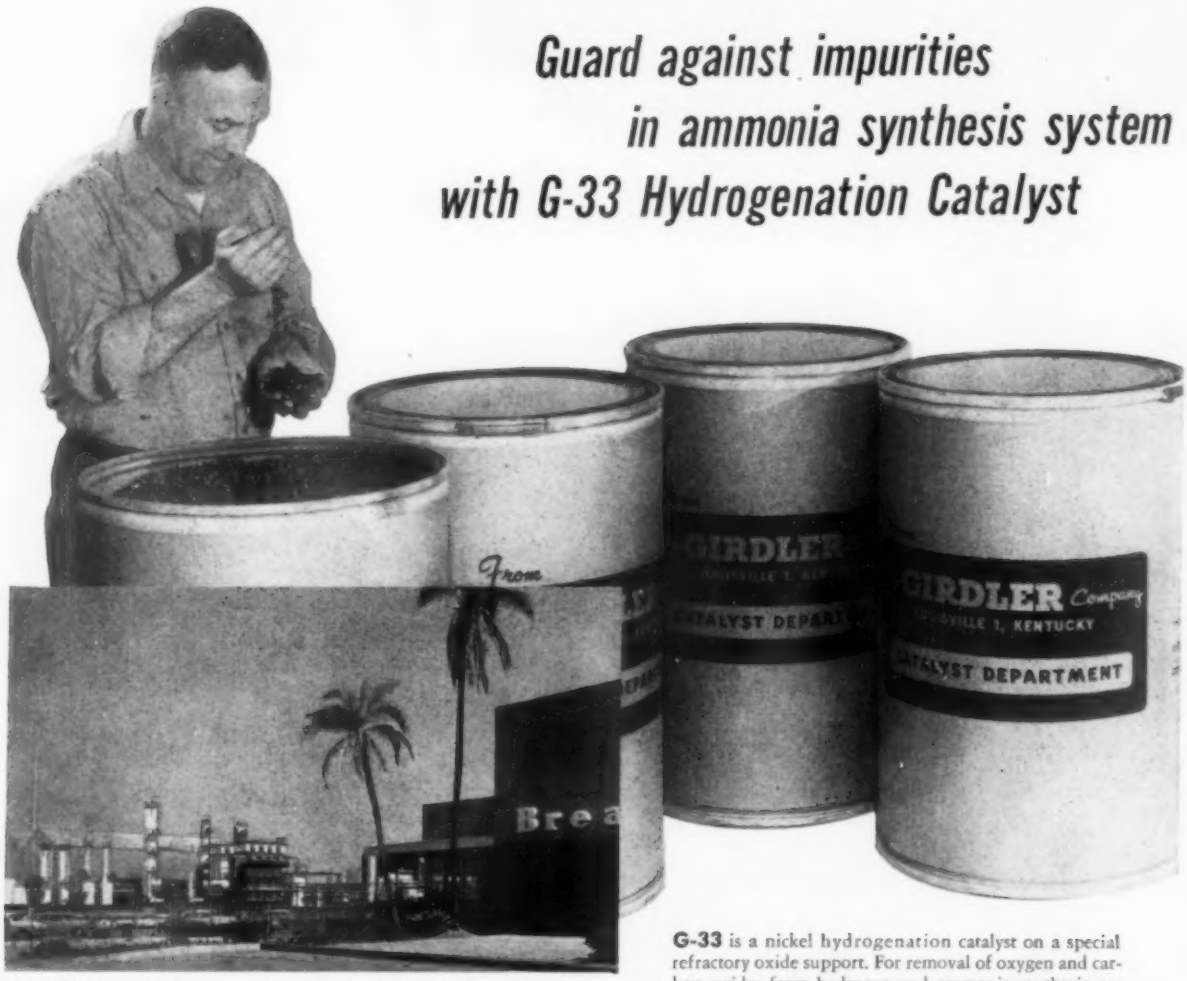
O·C·T

OIL CENTER TOOL CO.

Export Representatives: South America — East West Oiltools, C. A., Del Lago Hotel, Maracaibo, Venezuela. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston, Texas.

THEY COST O-C-T nearly $100,000 each, but these two new automatics will get emergency jobs to oil operators days earlier.

Guard against impurities in ammonia synthesis system with G-33 Hydrogenation Catalyst



Brea Chemicals, Inc., uses Girdler G-33 catalyst in the methanators to remove oxygen and carbon oxides in the feed gas to the ammonia synthesis system. This catalyst not only smooths out normal fluctuations in purity of the synthesis gas, but also protects the stream from abnormal concentrations of impurities which may result from upsets in the system.

G-33 is a nickel hydrogenation catalyst on a special refractory oxide support. For removal of oxygen and carbon oxides from hydrogen and ammonia synthesis gas streams where the catalyst may be subjected to *severe physical stress.* Also used for hydrogenation of organic compounds such as aldehydes, ketones and aromatics.

Physically rugged. G-33 catalyst must be able to perform under stresses induced by liquid or mixed phase operations. Girdler makes extensive analyses of physical properties to assure adequate strength. Write for bulletin on Girdler catalysts.

Want better performance? Girdler's continuing program of catalyst improvement, high standards of quality control, and experience in solving catalyst problems can help improve *your* processing.

CATALYST DEPARTMENT

GIRDLER MANUFACTURES CATALYSTS FOR: HYDROGENATION • SYNTHESIS GASES AND HYDROGEN GENERATION • DESULFURIZATION • NEW CATALYTIC PROCESSES

the **GIRDLER** Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

LOUISVILLE 1, KENTUCKY

MUELLER®

tie-in small lines under high pressure

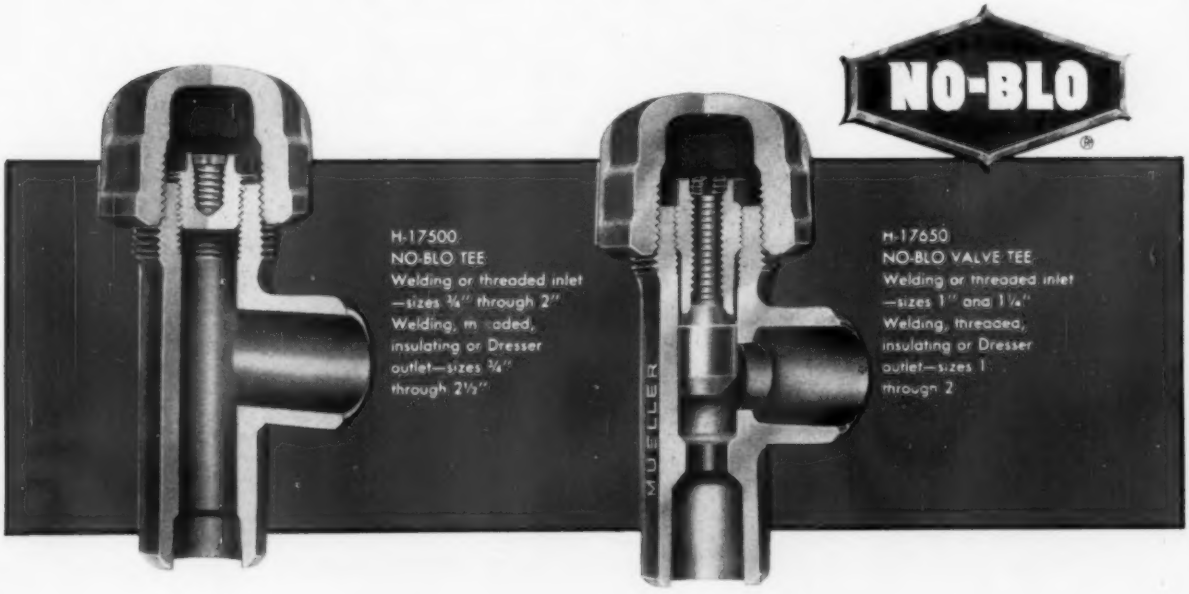
Use Mueller NO-BLO® Tees and Valve Tees to tie-in small lines anytime—anywhere. No need to shut-down or reduce line pressure. All operations are done without loss of fluid.

Tees are quickly welded to line and small line completed to first valve. A Mueller Drilling Machine is then used to drill through the tee and activate the line. Drilling is done through a valve mounted on top of the tee for complete control of pressure at all times.

An inside thread in the top of the tee permits a simple plug or stem and bushing to be inserted to hold the pressure while the valve is removed. A cap then provides a double seal against leakage. The stem and bushing used in the Valve Tee provides a simple built-in valve that is easily operated with only a screw driver and wrench for quick, positive shut-offs.

DRILLING MACHINES USED FOR INSTALLATION OF TEES

Pressures to 500 p.s.i. at 100° F.	"E-4" or "D-4"
Pressures to 1200 p.s.i. at 100° F.	"EH-1"
Pressures to 1200 p.s.i. at 100° F.	"DH-2"

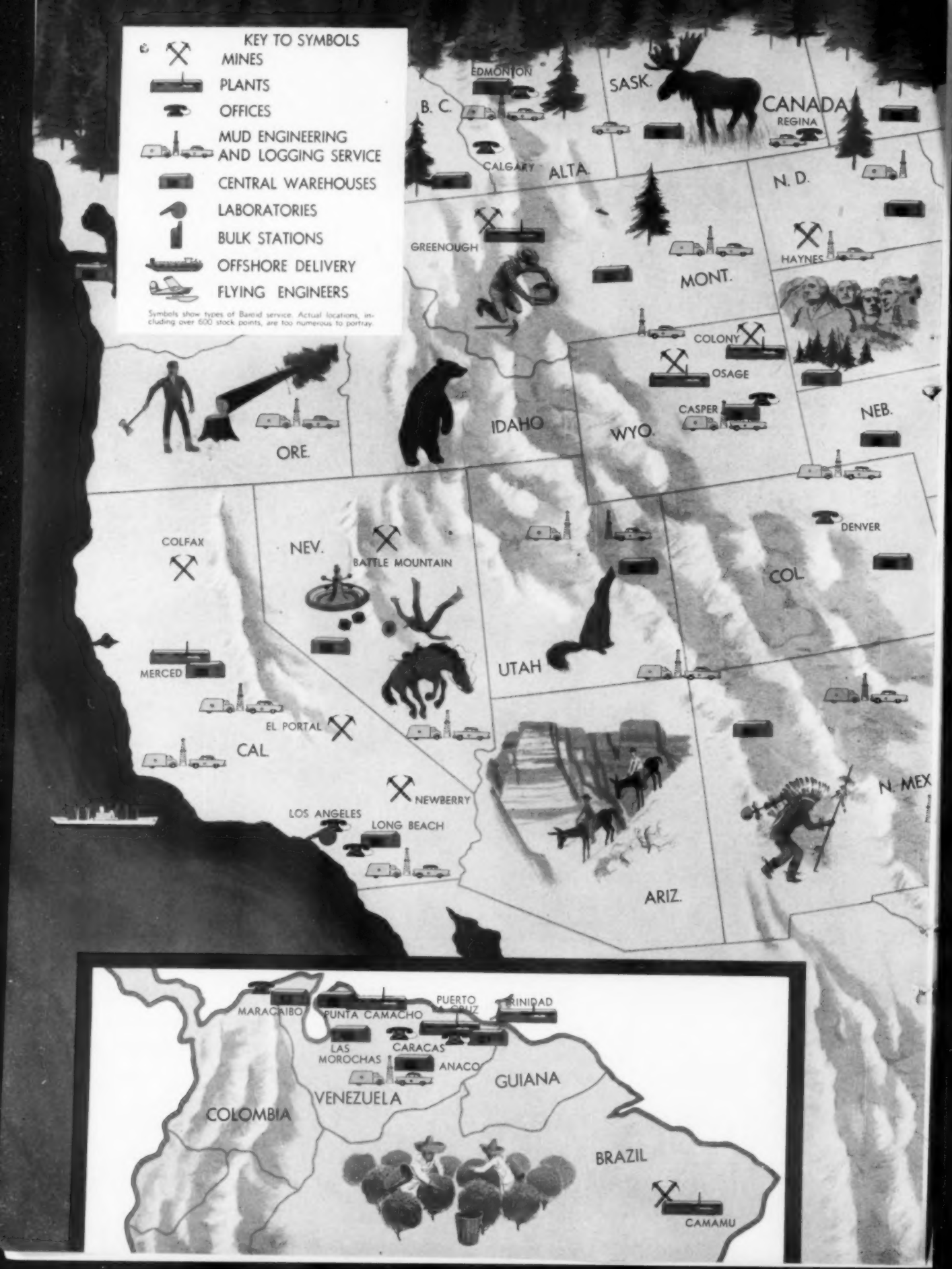


Contact your Mueller Representative or write direct for complete information on these and other NO-BLO fittings and equipment.

MUELLER CO.
DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles;
In Canada: Mueller, Limited, Sarnia, Ontario

Since 1857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Symbols show types of Baroid service. Actual locations, including over 600 stock points, are too numerous to portray.
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Not Only Abilities_ _Facilities Too!

Baroid can supply you what you need, when you need it, where you need it, in any quantities —and remember— when you buy Baroid, you buy the best.

BAROID DIVISION • **NATIONAL LEAD COMPANY**
P. O. Box 1675 **Houston 1, Texas**

After 15 months' service . . . Gathering lines of NATIONAL* PVC PIPE show no paraffin build-up!

In October 1955, the TXL Oil Corporation installed a 2,800-foot gathering line of USS NATIONAL Polyvinyl Chloride Pipe in the Permian Basin, 12 miles south of Odessa, Texas. Metal pipelines, previously used for this application, had required frequent steaming out to remove paraffin build-up which plugged the line.

Upon inspection of the NATIONAL PVC line, in January 1957, after 15 months of continuous service, the following was revealed:

a. Despite heavy, year-round use, the PVC line showed no evidence of paraffin build-up.

b. There had never been any reduction in flow.

c. The engineers responsible for installing the NATIONAL PVC line agreed that it had definitely solved a paraffin problem. They recommended it for future similar installations.

This 2,800-foot line of NATIONAL PVC Pipe was laid in *1¾ hours*. Average service temperature is 75°-80°F. Pressures average from 30 to 40 pounds.

NATIONAL Polyvinyl Chloride Pipe is available in two types, in sizes ½" to 6" inclusive and in Schedules 40, 80 and 120.

NORMAL IMPACT—for installations requiring the highest chemical resistance attainable, together with high strength and excellent creep resistance.

HIGH IMPACT—for installations requiring excellent chemical resistance and a high degree of toughness even at low temperatures.

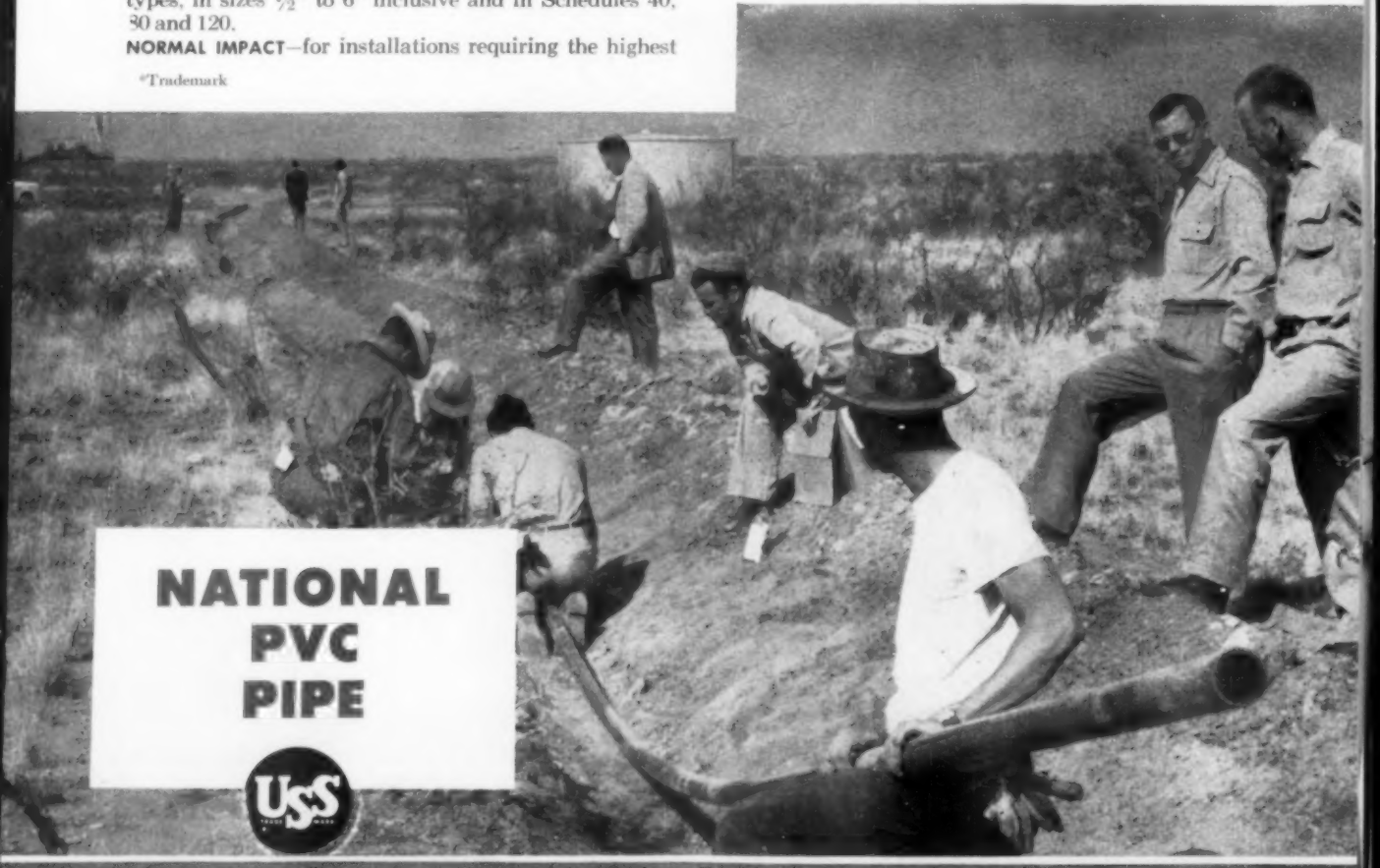
Rigid PVC Pipe is immune to acids, alkalis, salts, fungi, bacterial action and soils, as well as a multitude of chemicals. It may be joined by threading, heat welding, solvent cementing or adhesives. It is marked every two feet with size, schedule, pressure and temperature.

Send for Bulletin No. 24 and get the full story on USS NATIONAL PVC Pipe. Write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

This seal of the National Sanitation Foundation is carried on all USS National Polyvinyl Chloride Pipe, and means Tested . . . Approved . . . Sanitary!

*Trademark

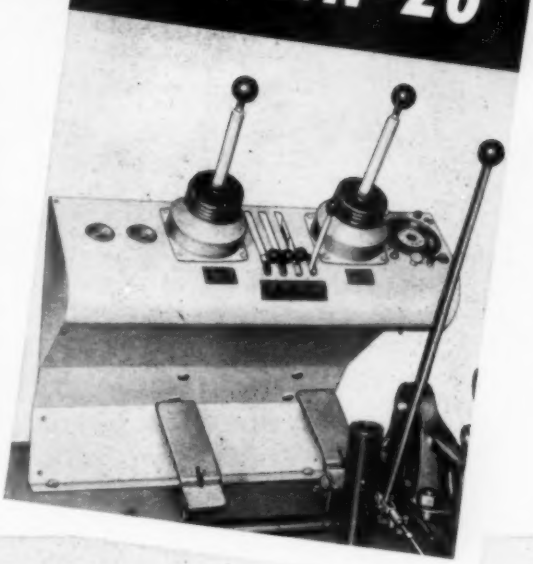
NATIONAL TUBE DIVISION
UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



UNITED STATES STEEL

Operators never had it so easy as at the . . .

controls of a LORAIN-26



Try the 2-Lever, "Joy-Stick" Hydraulic Power Controls available on a Lorain-26 Pipeliner and you will never want to go back to the old 3 and 4 lever controls of other models. For here is the newest, simplest, most responsive and effortless control in a pipeline excavator today. Only 2 hand levers operate hydraulically all 5 clutches which control direction and transmission of power for all turntable operations. And, with the 2-lever, "Joy-Stick" design, the operator "meters" the power to clutches at any rate desired — a little or a lot — slowly or rapidly — and still retains the normal "feel" of all operations. Result is faster, smoother, easier operation — fewer motions, less operator fatigue — higher production.

Ask your Thew-Lorain Distributor for all the new ideas in the Lorain-26 Pipeliner . . . the 2-lever, "Joy-Stick" feature . . . the Torque Converter that automatically matches power to digging demands . . . a heavy-duty, sturdy crawler with enclosed, protected tread lock . . . hydraulic power operation of all crawler functions . . . sealed idler rollers on anti-friction bearings available . . . a longer, heavier Hoe Boom that digs harder materials — and digs deeper . . . these are a few. Be sure to get the Lorain-26 "Pipeliner" story.

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

Invite Wilson to your next pump wrecking party!

. . . a wrecked slush pump with an old-fashioned gear drive is costing operators untold thousands of dollars in repairs alone, not to mention down-time. But not if you buy a Wilson . . here's why . .

Wilson Slush Pumps have chain drive . . . you can't tear up the power end of a Wilson Pump. The worst that can happen is a broken link. Replacement with a standby chain or making an on-the-job repair with the Wilson Chain Repair Kit is fast and easy. No gears to repair or other expensive damage. Wilson chain sprockets are guaranteed for five years.

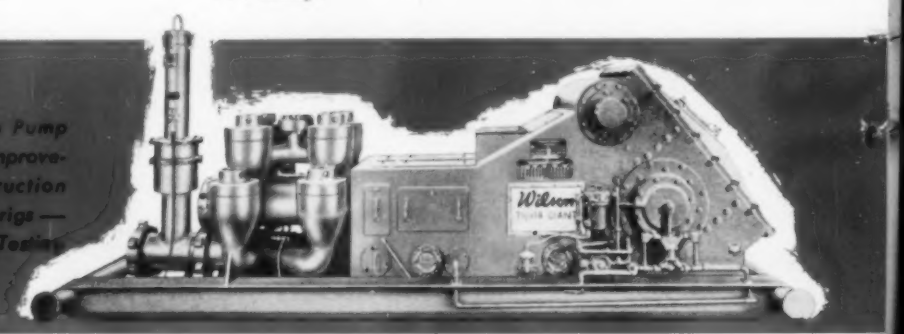
Streamlined, cast steel fluid end of Wilson Pump prevents washouts. And if a washout should occur somehow, it can be welded promptly at small cost in the field.

Wilson Suction Flow Equalizer eliminates knocking, the tell-tale sign of lost efficiency and possible trouble. The Wilson Suction Flow Equalizer gives the pump higher volumetric efficiency, boosts horsepower capacity up to 50%.

Extra strong, fabricated steel case greatly reduces overall pump weight and is quickly welded on the job if damaged.

Wilson Slush Pumps with a rating of 600 input horsepower are carried in stock ready for immediate delivery. They can be rushed to any point in the mid-continent area in about 24 hours from the time you call in your order. Just call your favorite supply store, your nearest Wilson Representative or call us direct. Say goodby to costly pump repairs, buy a chain driven Wilson . . . today!

This Wilson Chain Driven Pump introduces the first major improvement in slush pump construction since the advent of power rigs — Result of 17 years of Field Testing



Wilson

For full information on Wilson Pumps, call or write

WILSON MANUFACTURING CO., INC.

Phone 2-2154 • Wichita Falls, Texas • *The Home of RED IRON*

BE MODERN – BUY WILSON

Yellow Strand®

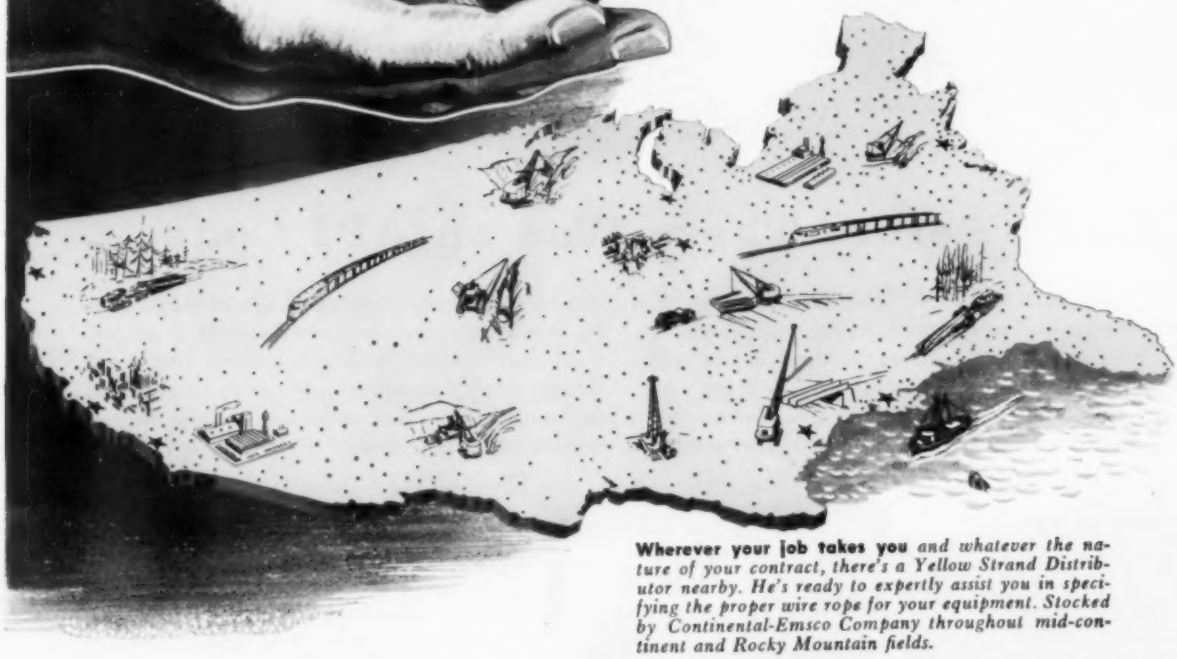
. . . always on hand

Always nearby—always in ample supply—always top quality! That's why it pays to *specify* Yellow Strand Wire Rope for your equipment.

Yellow Strand is always on hand at your nearby Broderick and Bascom Distributor. He is probably the same man who takes care of your equipment, parts and service needs. He is served by a nearby B & B factory or warehouse.

This nationwide network of distributors, branches and factories is unique in the wire rope industry. It assures you the correct wire rope when you want it!

You can be *sure* of good performance when you use Yellow Strand "POWER-STEEL" and Yellow Strand Flattened Strand Wire Ropes—and *doubly* sure when they're backed by your B & B Distributor.



Wherever your job takes you *and whatever the nature of your contract, there's a Yellow Strand Distributor nearby. He's ready to expertly assist you in specifying the proper wire rope for your equipment. Stocked by Continental-Emsco Company throughout mid-continent and Rocky Mountain fields.*

Yellow Strand®

BRODERICK & BASCOM ROPE CO.

Manufacturers of Wire Rope for over 80 Years

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November, 1912 NATIONAL PETROLEUM NEWS 33

STEEL TANKS and PLATE WORK

"GRAVER TANKS"

NEED NO INTRODUCTION TO THE

"Independent Dealer"

AS THEY HAVE BEEN

"Favorably Known"

EVER SINCE THE DISCOVERY OF OIL

Large Oil Storage Tank—All Steel Construction

We are carrying in stock, for prompt ... of from 12,000 to 20,000 gallons ca-
y. Our prices will interest you and our cons... stant approval.

WE MAINTAIN AND OPERATE OU...

Large Field Tanks ...

A SPECIALT...

WM. GRAVER TANK W...

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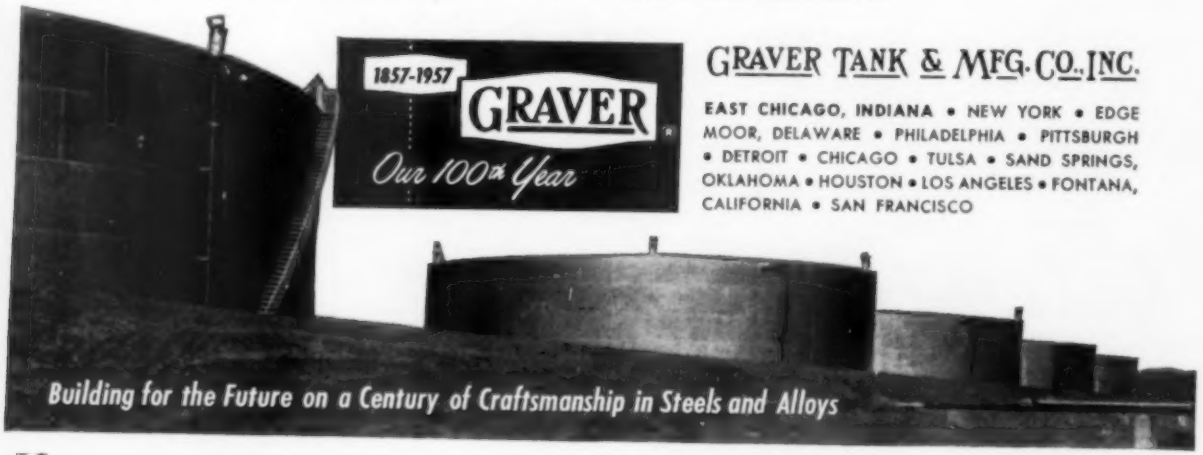
DENVER, COLO., 1716 California St. LOS ANGELES, CAL., 312 Security Bldg. SALT L... 523 Newhou...

Long Before There Was an API Code . . .

. . . cone roof tanks built by Graver always met the exacting quality standards rigidly insisted upon by William Graver, Sr., from the time he first began building tanks in 1857.

Over the years, many of the improvements in cone roof tank design and in fabrication and erection techniques were originated by Graver to meet the demand for larger tanks in a variety of shapes.

As Graver begins its second century, traditional Graver quality standards continue to be preferred by buyers of cone roof tanks seeking long life and trouble-free maintenance.

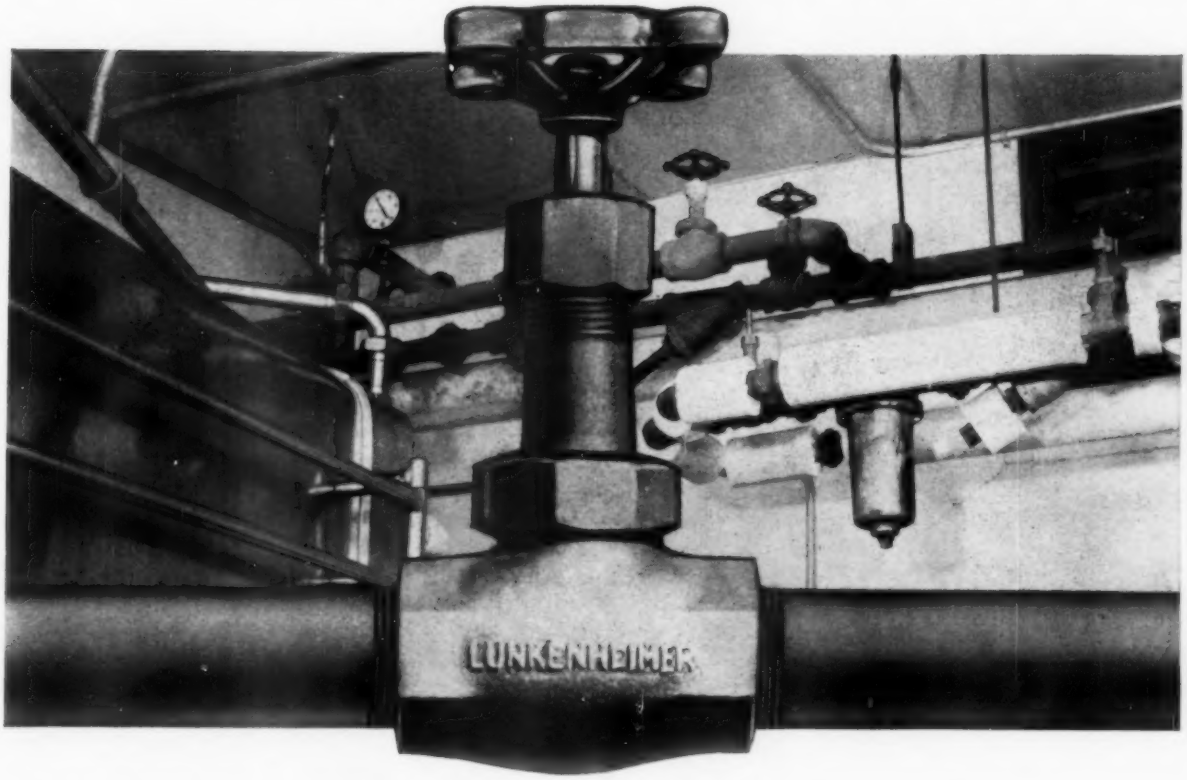


GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA • NEW YORK • EDGE MOOR, DELAWARE • PHILADELPHIA • PITTSBURGH • DETROIT • CHICAGO • TULSA • SAND SPRINGS, OKLAHOMA • HOUSTON • LOS ANGELES • FONTANA, CALIFORNIA • SAN FRANCISCO

Building for the Future on a Century of Craftsmanship in Steels and Alloys

ONE ANSWER
to spiraling maintenance costs



LQ600—The Most Maintenance-Free Bronze Globe Valve Ever Developed!

The moment a maintenance man touches a wrench to a valve, its cost can double. You can't bring down that labor expense in many plants, but you can buy valves with an outstanding record of trouble-free service. At no time in history has valve quality been so important to your total plant expense. And quality has been a tradition for nearly a hundred years at The Lunkenheimer Company, Box 360, Annex Station, Cincinnati 14, Ohio.

See your cost-reducing Lunkenheimer distributor . . . or write for literature.

BRONZE • IRON • STEEL • PVC

The cost of a LUNKENHEIMER VALVE
Gets smaller...and smaller...and smaller...
with each passing year of dependable service

L-757-9

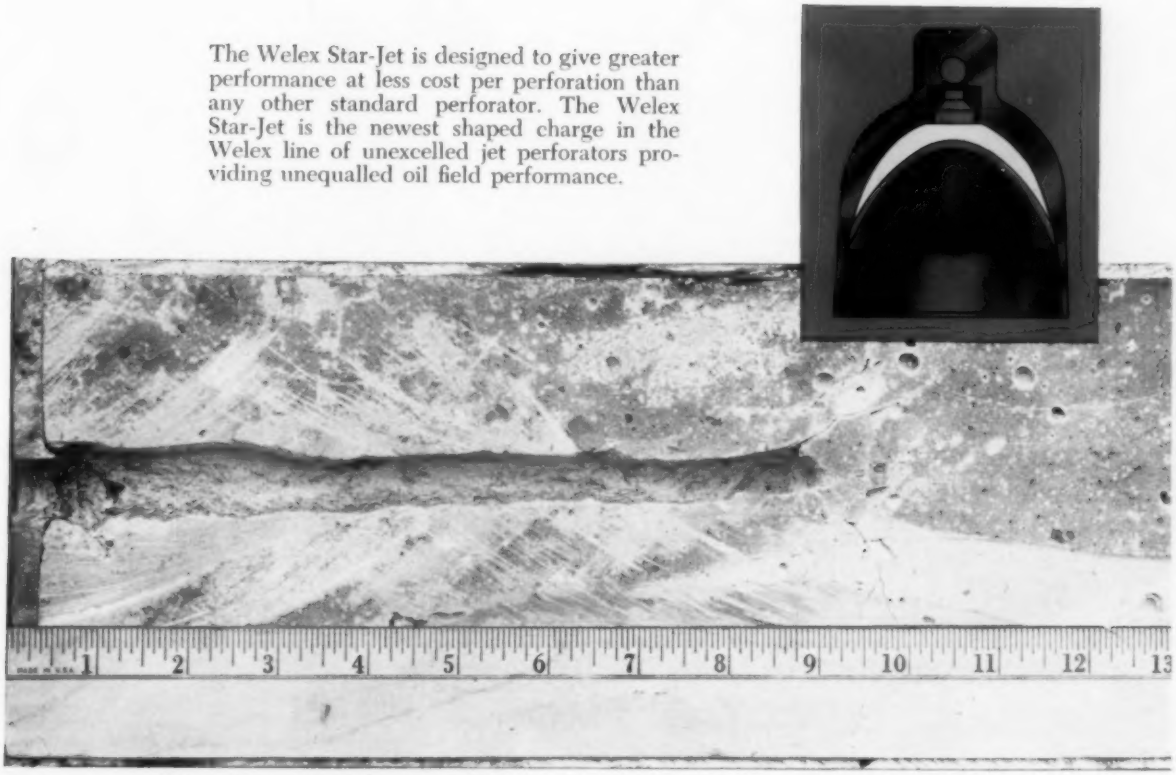
LUNKENHEIMER

LUNKENHEIMER®
THE ONE *Great* NAME IN VALVES

star jet
ORIGINATORS OF
Welex
JET PERFORATING

for Economy and Performance

The Welex Star-Jet is designed to give greater performance at less cost per perforation than any other standard perforator. The Welex Star-Jet is the newest shaped charge in the Welex line of unexcelled jet perforators providing unequalled oil field performance.



Welex Star-Jet fired through ½" of water through 5½" N80 17# casing into 21-day neat cement gives 0.50" entrance hole, 9.00" penetration depth and 29.00 cc. hole volume.

for Economy – The Welex Star-Jet is priced to give the greatest reduction in cost per perforation of any similar casing perforator, yet it is priced comparable to standard perforating guns. Star-Jet is available from any Welex District office in three sizes – 3⅜", 4" and 5" casing guns. Compared to other standard perforators, the Welex Star-Jet is your most economical method of casing perforation.

for Performance – The Welex Star-Jet tests conducted under strict regulations provide the following performance data: Entrance Hole – 0.50", Penetration Depth – 9.00" and Hole Volume – 29.00 cc. Compare these results with other perforators and you have proof that the Welex Star-Jet is the only standard perforator that gives you outstanding performance at a minimum expense.

Perforating is no sideline with Welex!

WELEX JET SERVICES, INC.

1400 East Berry, Fort Worth, Texas

Division Offices: Denver – Houston – Midland – Tulsa. **Sales Offices:** Dallas – Oklahoma City – Wichita. **District Offices:** Abilene Ardmore – Beaumont – Bowie – Corpus Christi – Cortez – Falfurrias – Farmington – Great Bend – Hobbs – Houma – Houston – Kilgore Kimball – Lafayette – Lake Charles – Liberal – Odessa – Pampa – Pauls Valley – Pawhuska – Plainville – San Angelo – Shawnee – Shreveport Snyder – Stillwater – Wichita Falls – Winfield

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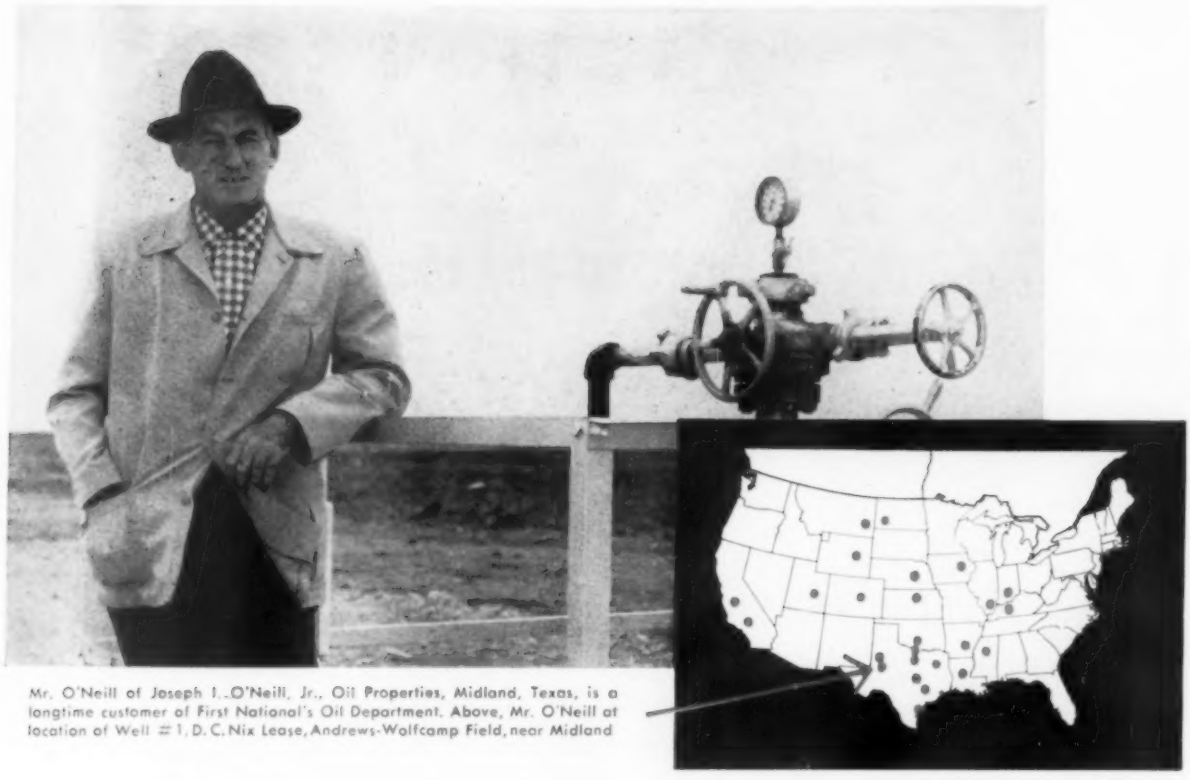
Oil Financing from the **FIRST** *in* **DALLAS**
goes where you go . . .



Mr. O'Neill of Joseph I. O'Neill, Jr., Oil Properties, Midland, Texas, is a longtime customer of First National's Oil Department. Above, Mr. O'Neill at location of Well #1, D. C. Nix Lease, Andrews-Wolfcamp Field, near Midland

Specialized experience, organization, and resources to help you with practically any kind of need for "working money".

FIRST NATIONAL BANK IN DALLAS

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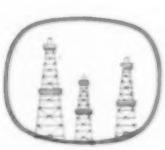
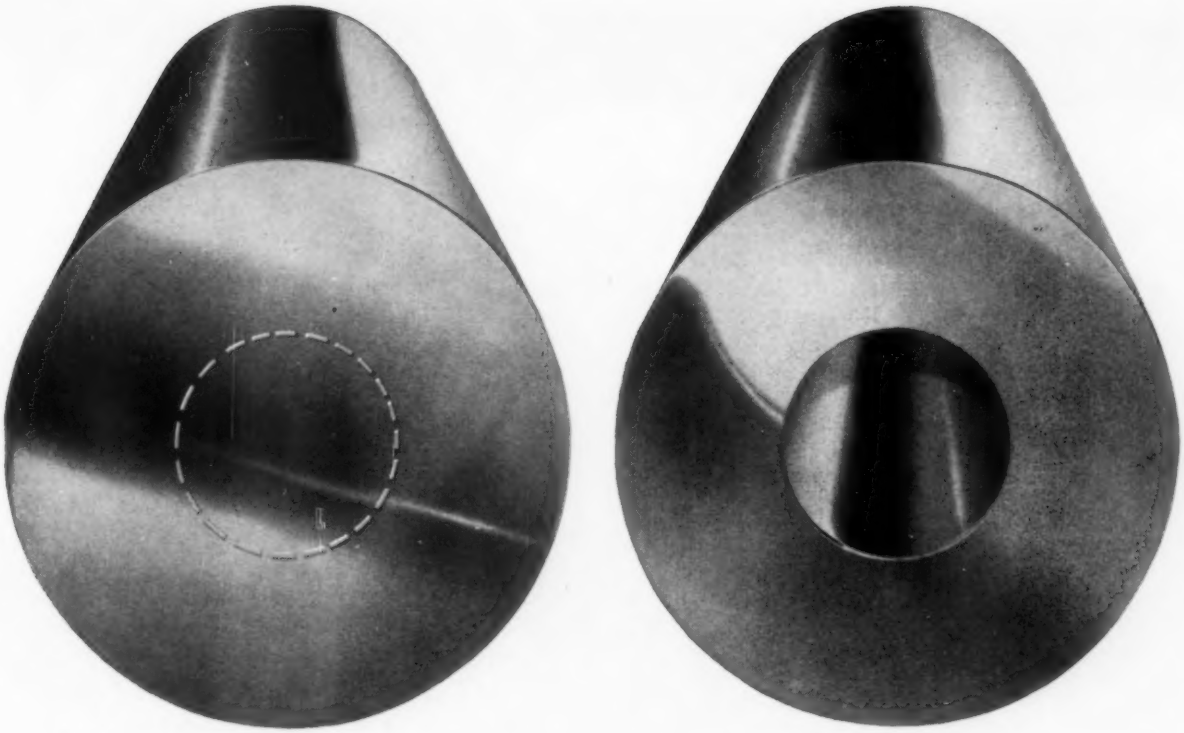


put FIRST financing
in your own oil future



WHY BORE OUT BAR STOCK...

use TIMKEN® heavy wall seamless pressure tubing for high temperature applications

IF you've been boring out forgings or bar stock to get the wall thickness you need to withstand higher operating pressures in refineries, steam plants or chemical plants, Timken® seamless steel tubing can save you money. The hole's already there. And you can get the wall thickness you need.

Timken seamless steel tubing is ideally suited to today's higher operating pressures. The piercing process we use gives it a fine forged quality. It also imparts a spiral grain flow for greater strength, a refined grain structure that brings out the best in the metal. And the quality you get is uniform from bar to bar, heat to heat, tube to tube. It's electric furnace fine alloy steel—quality controlled every step of the way.

Over 20 years of research and experience makes Timken Company metallurgists the recognized authorities on heavy wall pressure tubing. Ask the experts! Let them help you select—from 22 different analyses and sizes up to 11" O.D.—the size and analysis best suited to your needs. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

Naugatuck Paracril

oil-resistant rubber, stretches across *all* industries!

Chemical rubbers with true *stamina* under the most critical conditions, the PARACRILS assure your products longer service life by providing...

- **improved oil resistance**
- **greater dimensional stability**
- **increased tensile strength**
- **high abrasion resistance**
- **unusual low-temperature flexibility**
- **excellent resistance to aging**

PARACRILS are butadiene-acrylonitrile copolymers with outstanding resistance to animal, mineral and vegetable oils, fats, and greases. They are fully compatible with other rubbers and plastic resins to impart many special properties. And PARACRIL® stocks can be calendered, extruded, or molded by standard rubber-forming techniques.

Graded to provide specific property values, the PARACRILS are the superior oil-resistant rubbers suited for: hose, belting, seals, diaphragms, linings, printing blankets, rolls, flooring, proofed goods, and a wide variety of molded articles.

If your rubber or rubber-like products require high oil resistance or dependable performance under the most deteriorating conditions, why not investigate Naugatuck's PARACRILS? For complete information on this family of chemical rubbers, please write to us on your company letterhead.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

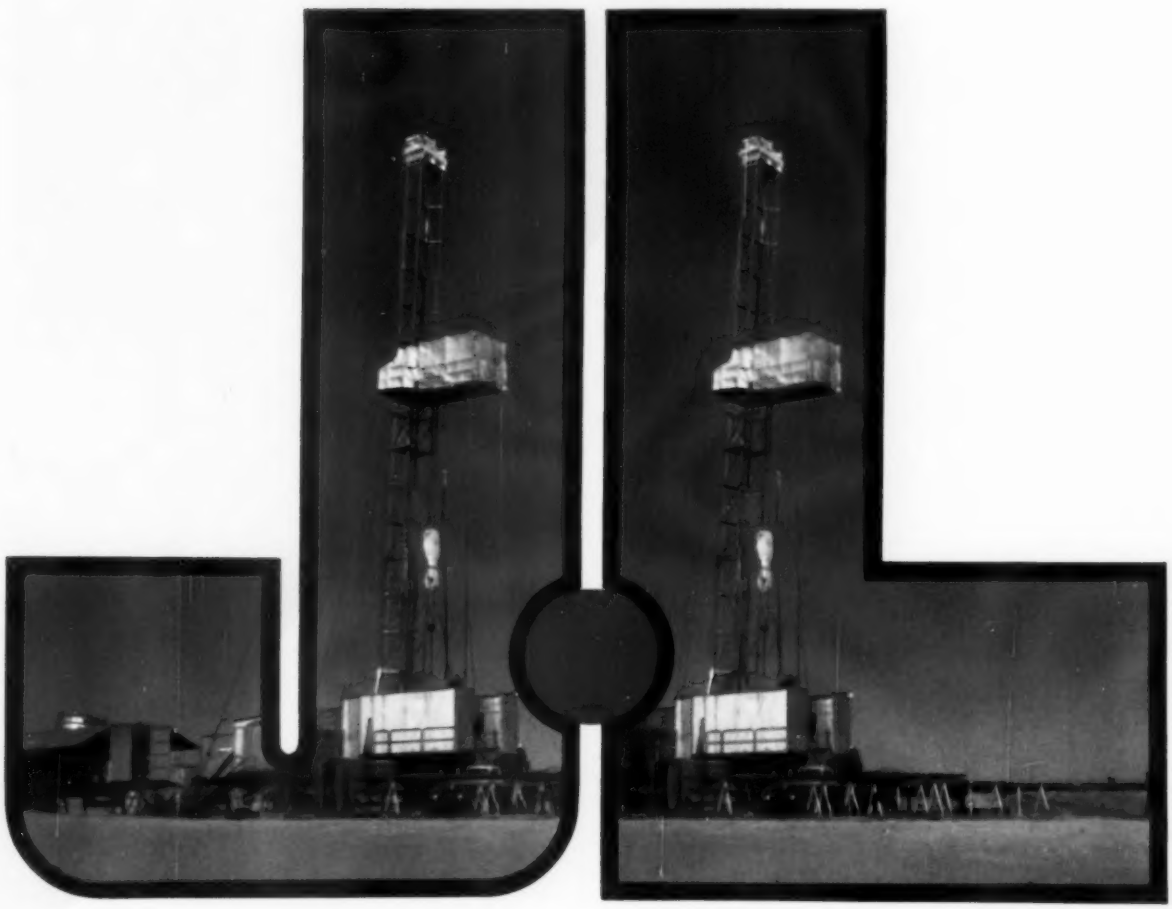
US RUBBER

IN CANADA: NAUGATUCK CHEMICALS, Elmira, Ontario • Cable Address: Rubexport, N.Y.
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

Drilling WITH J&L SUPPLY

A customer adds hundreds of competent men to his service and advisory staff and not one cent to his payroll with drilling equipment from J&L Supply. When he moves in with such equipment—anywhere in the United States or Canada—J&L Supply men are waiting like old friends and neighbors with parts, service, encouragement.

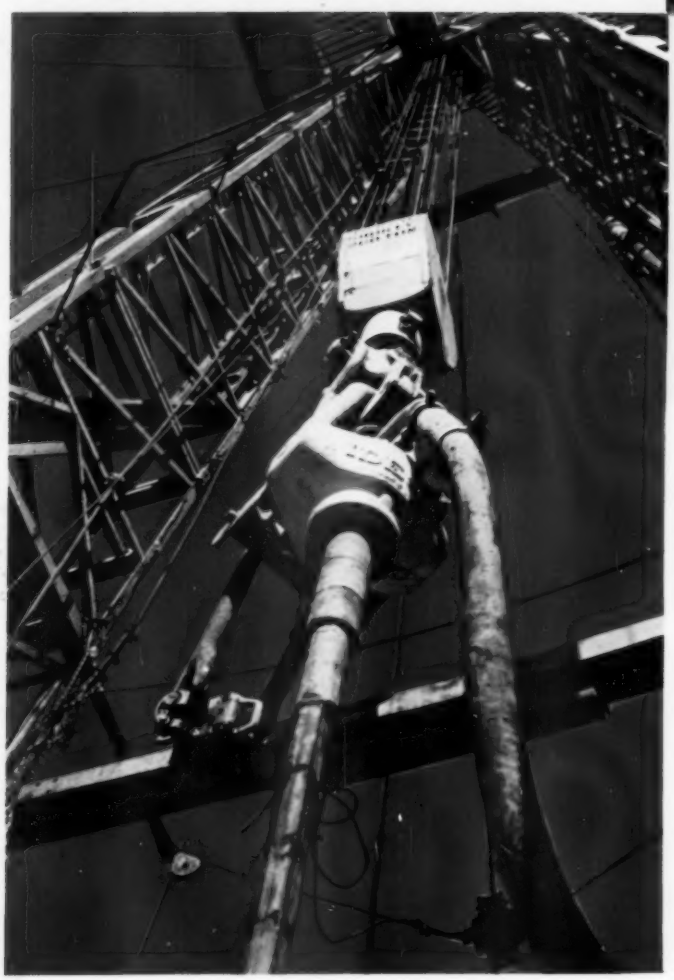
On this page a Nebraska scene featuring J&L Supply equipment tailor-made to a major oil company's requirements by Ideco. Diesel electric dual Rambler rig with 105′ Kwik-Lift mast and "E-525" drawworks.



Ideco Mechanical, Electrical, or Hydrair rigs and streamlined rotaries give a driller the feeling that everything's coming his way. And everything is; he has complete control and knows it. Ideco—the most wanted drilling equipment in the world! One third of all rotary tables are Ideco! Table openings from 12″ to 27½″; capacities from shallow workover to deepest drilling. Rig capacities (4½″ drill pipe) to 25,000′. Rigs to 6,000′ capacity can be trailer mounted.

Jones & Laughlin's standard rotary drilling lines with IWRC are made to the industry's most exacting standards to give the driller the utmost in strength and life. In addition, J&L offers SpringKore rotary drilling lines that bring a new concept to rotary drilling with great crush resistance, more internal lubricant, and the greatest flexibility, all of this at the lowest steel center cost. For cable tool drilling, J&L's PlastiKore has a center impervious to acids, salt water, and caustics that so frequently cause early failure in standard fiber center lines.

Nothing adds more to the confidence of a driller than J&L Blue Ribbon Drill Pipe. This is the drill pipe that digs the world's deepest wells with the greatest safety. This is drill pipe inherently right. J&L Supply service goes with it everywhere, alert, informed, helpful. Internal or external upset. Blue Ribbon Heat-treated Alloy Steel, or Blue Ribbon plus Vanadium. Upset for grip type, counterbore weld and flashweld tooljoint application.

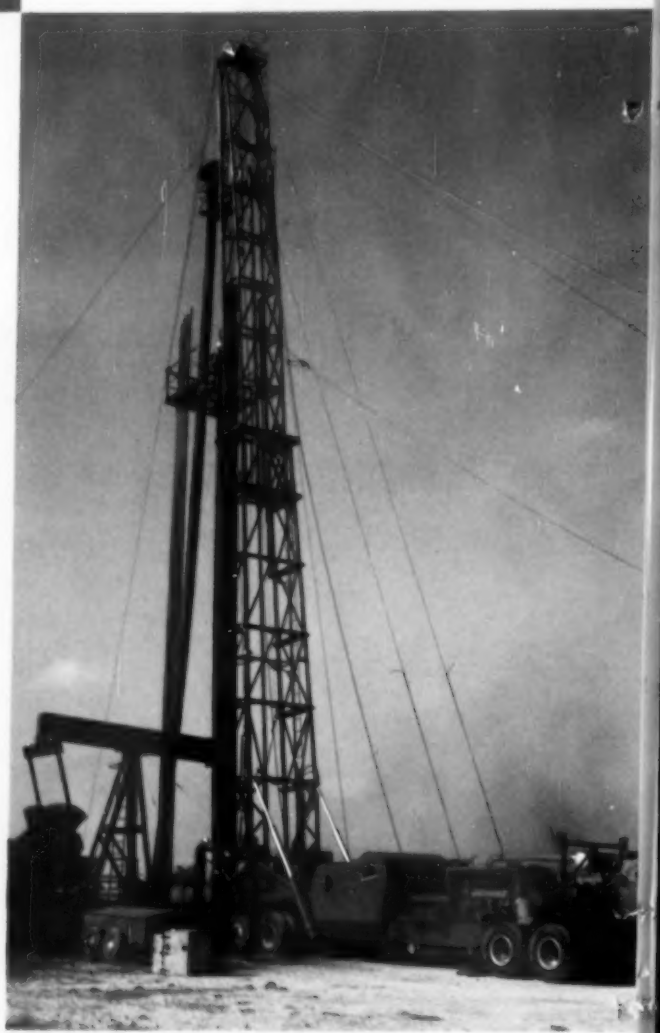


Fast (low center of gravity) Ideco Shorty Blocks add as much as 9′ of headroom when unitized with the spring-loaded hook — and they are made to add ton-miles to wire line endurance. To this end the "Fabriform" sheaves are balanced on Double Tapered Timkens for positive alignment regardless of fleet angle or line load, and the roll-forged flame-hardened rims are smooth — even the grain structure is uniform. Automatic safety lock, ingenious hook, and a patented hydraulic cushion provides jarless starts and stops. The Ideco Shorty teams up with the Ideco crown block to give capacities to 560 tons, for truly dependable performance.

Republic Rotary Hose and Ideco Streamlined Swivels give drilling mud a trouble-free right-of-way. The Ideco floating washpipe can be repacked by one man in about 22 minutes with a sealed packing assembly stocked by J&L Supply. The swivel is then normally ready for many more wells before washpipe or packing needs further attention. As for the Republic hose — the higher the pressure the tighter the seal, thanks to the patented connection.

Left, Franks Cruiser. Single or double drum hoist and single or double pole mast with pulling capacities of 2,500′ to 12,000′ depending on the model. Choice of gas, gasoline, LPG, or diesel engine. Hard brake flanges; full-air clutches; one-point brake adjustment; simple, convenient controls. Torque converter drives, and hydraulic equipment for power tongs and other time- and labor-saving devices if desired. Unit anchors quickly and easily under conventional derrick. Can be driven away from pole mast for remote swabbing. The Franks Cruiser justifies its great popularity with J&L customers.

Right, Franks Clipper. Three sizes, with pulling capacities to 14,000′. Low center of gravity. Even weight distribution. Fully protected cab. Heads into location — important when the approach is difficult. Widespread outriggers, balanced for one-man positioning. Telescoping derrick hydraulically operated; automatic lock and stacking board. Remote console gives operator unobstructed view and positive control of the fast, flexible unit. Optional features include hydraulic drive for power tongs and other equipment. Most advanced unit on the market for servicing and workover.



Jones & Laughlin

SUPPLY DIVISION – Tulsa

J&L – A GREAT NAME IN SUPPLIES

LARGER SIZE RANGE

MIDWEST ELBOWS

IMPROVED DELIVERY

HEAVY WALL CARBON STEEL AND ALLOY

12" Long Radius
2¼" Wall Thickness
1¼% Chrome

20" x 10" Reducing
2" Wall Thickness
2¼% Cr—1% Mo.

STRAIGHT LONG RADIUS 90° ELLS

Nominal Pipe Size	Maximum Wall Thickness
36	1.250
30	2.000
26	2.000
24	1.500
20	1.375
18	2.250
16	2.125
14	1.750
12	2.000
10	2.000
8	1.750
6	1.000
5	.625
4	.750
3	.625
2½	.375
2	.500

These straight elbows can be furnished with LONG TANGENTS at no extra cost. All thicknesses less than those shown above are, of course, available.

The exclusive Midwest method of making all welding elbows from plate instead of tubing gives us a FLEXIBILITY OF MANUFACTURE that is much greater than by any other process. These heavy wall Midwest straight and reducing elbows are available in any material that can be secured as plate. The maximum wall thicknesses for which we now have equipment are indicated by the tables at left and right. And, because it is easier to get plate than tubing, better delivery is another advantage. Still another is the close tolerances inherent in our process.

Quality control goes beyond all code requirements. The longitudinal weld of every heavy wall elbow is completely X-rayed as standard procedure in our method of manufacture.

You will find it to your advantage to send us your inquiries.

REDUCING LONG RADIUS 90° ELLS

Nominal Pipe Size	Maximum Wall Thickness
30	2.000
26	*
24	2.000
20	2.000
18	2.000
16	1.500
14	1.750
12	2.250
10	2.000
8	1.750
6	1.000
5	.625
4	.750
3	.625
2½	.375
2	.500

Reductions to all nominal pipe sizes down to ½ large diameter. All thicknesses less than those shown above are, of course, available.
*Refer to factory.

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Engines and Power Units FOR GAS COMPRESSORS

Typical Waukesha-driven compressor application (Model WAKU engine) in Southwest

● You can select exactly the right power to meet your gas compressor needs because the Waukesha Engine line is complete. All the proven features that give long engine life . . . the ability to withstand overloads . . . low upkeep and high economy of operation . . . are built-in. Materials, design and operating characteristics—all result from Waukesha's over 50 years of experience in fine engine building. You cannot buy a better compressor engine.

NATURAL GAS ENGINES FOR COMPRESSOR SERVICE				ENGINE	BRAKE HP. AT SPEEDS INDICATED							
Model	Bore & St.	Displ.	Installation	MAX. HP.	800	900	1000	1100	1200	1400	1600	1800
140-GZB	4⅜ x 5½	554	No radiator or fan	142 @	44	....	55	....	65	75	84	92
			With radiator, fan	1800	43	....	53	....	62	71	79	85
145-GZB	5⅜ x 6	817	No radiator or fan	214 @	65	....	81	....	96	110	125	139
			With radiator, fan	1800	62	....	77	....	90	103	116	129
WAKB	6¼ x 6½	1197	No radiator or fan	260 @	85	....	110	....	134	153	169	
			With radiator, fan	1600	82	....	106	....	127	144	157	
NKRB	7 x 8½	1905	No radiator or fan	335 @	155	170	187	203	218			
			With radiator, fan	1200	149	163	176	189	199			
LRORB	8½ x 8½	2894	No radiator or fan	465 @	228	250	268	283	302			
			With radiator, fan	1200	221	242	257	271	286			
LRZB	9⅜ x 8½	3520	No radiator or fan	568 @	273	304	330	351	369			
			With radiator, fan	1200	265	294	316	332	343			
VLROB	8½ x 8½	5788	No radiator or fan	890 @	435	481	524	557	579			
			With radiator, fan	1200	427	470	510	541	559			

65% ratings

NOTE: All models are 6-cylinder except Model VLROB (12-cyl.) and have aluminum pistons, counterbalanced crankshafts, and vibration dampeners.

Send for descriptive Bulletin No. 1699

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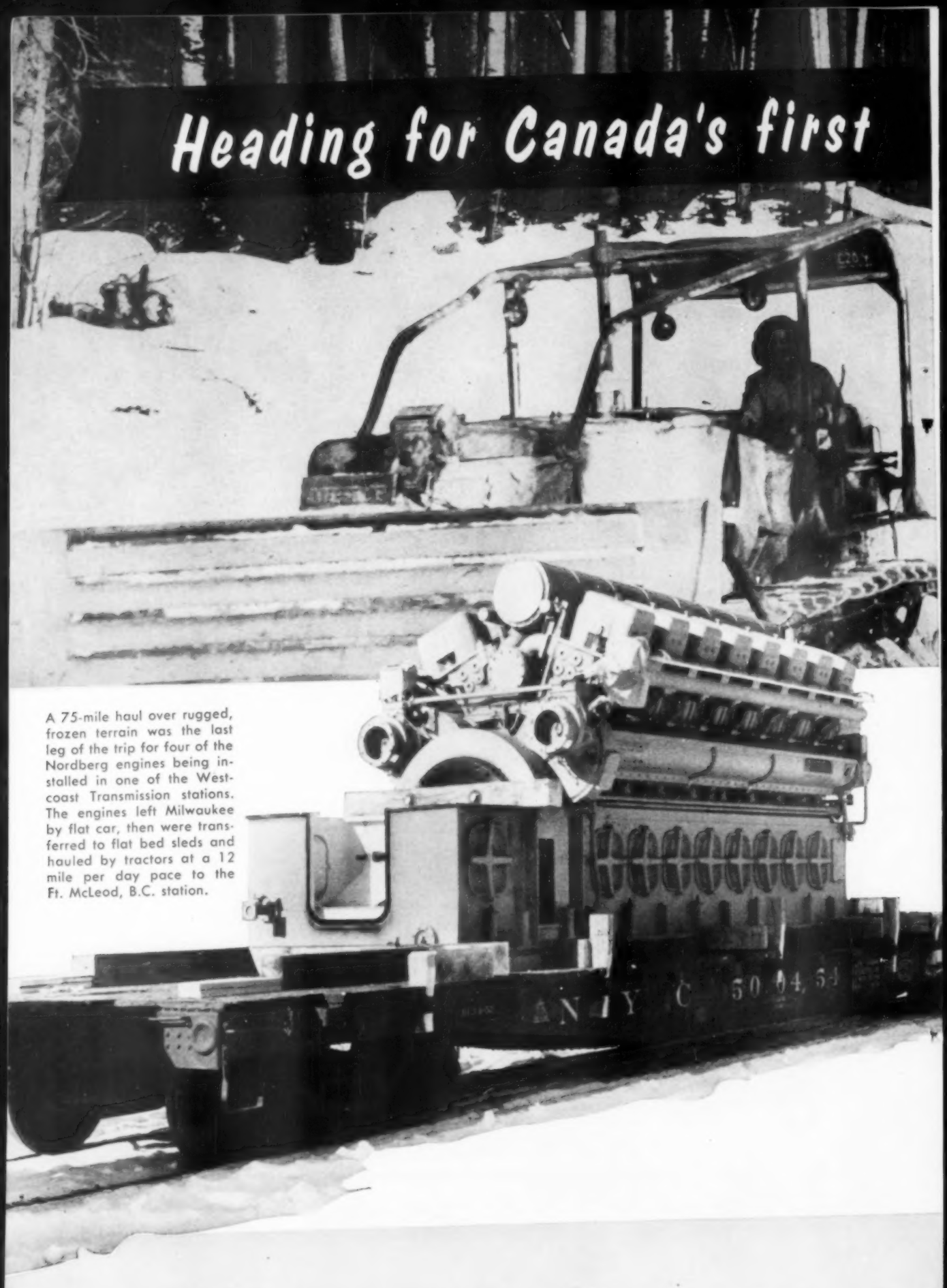
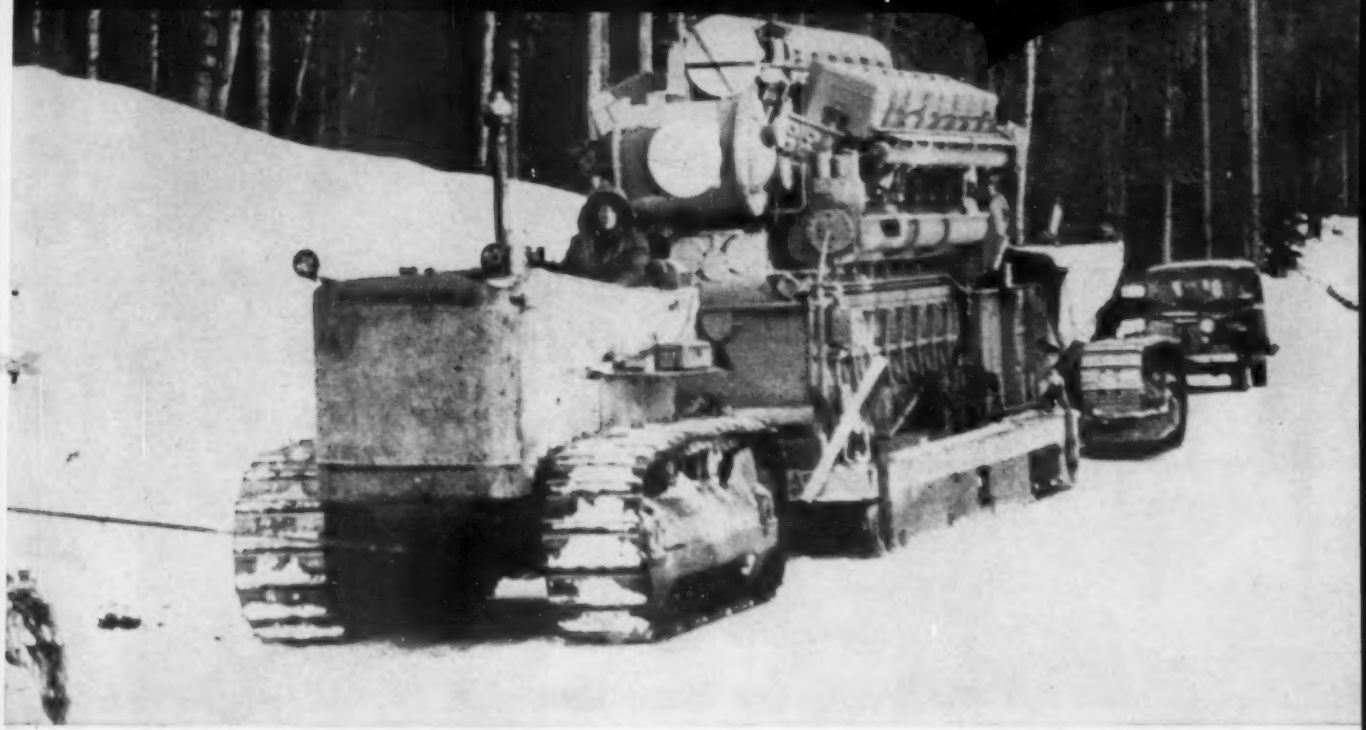
Heading for Canada's first



A 75-mile haul over rugged, frozen terrain was the last leg of the trip for four of the Nordberg engines being installed in one of the Westcoast Transmission stations. The engines left Milwaukee by flat car, then were transferred to flat bed sleds and hauled by tractors at a 12 mile per day pace to the Ft. McLeod, B.C. station.

"BIG-INCH" Gas Pipeline...



11 Nordberg Supairthermal® Gas Engines

to Power Compressor Stations for WESTCOAST TRANSMISSION CO., LTD.

Westcoast Transmission, Canada's first large-diameter gas pipeline, is expected to have gas flowing by fall, from the Peace River area of Alberta and British Columbia to the international border near Sumas, Washington.

Power for three of the compressor stations on this new 650-mile, 30" line will be furnished by eleven Nordberg 4-cycle V-type Supairthermal spark-ignition gas engines, rated 3550 bhp at 500 rpm. Each of these powerful, compact 16-cylinder engines are direct-connected to an integral 10 to 1 Nordberg speed increasing gear, to drive a DeLaval centrifugal gas compressor at 5000 rpm to produce the required pipeline "push."

These engines for Westcoast Transmission are typical of the increasing number of Nordberg Supairthermal gas engines being ordered and installed by major gas transmission companies . . . who have specified these engines on the basis of lower cost per installed horsepower, lower operating cost, and their ability to handle variations in volume and compression ratios with high efficiency at variable speeds.

Consult Nordberg on *your* next pipeline power problem . . . for natural gas, crude or products transportation. *Nordberg Mfg. Co., Milwaukee, Wisconsin.*

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DIESEL • DUAFUEL® AND SPARK-IGNITION GAS ENGINES

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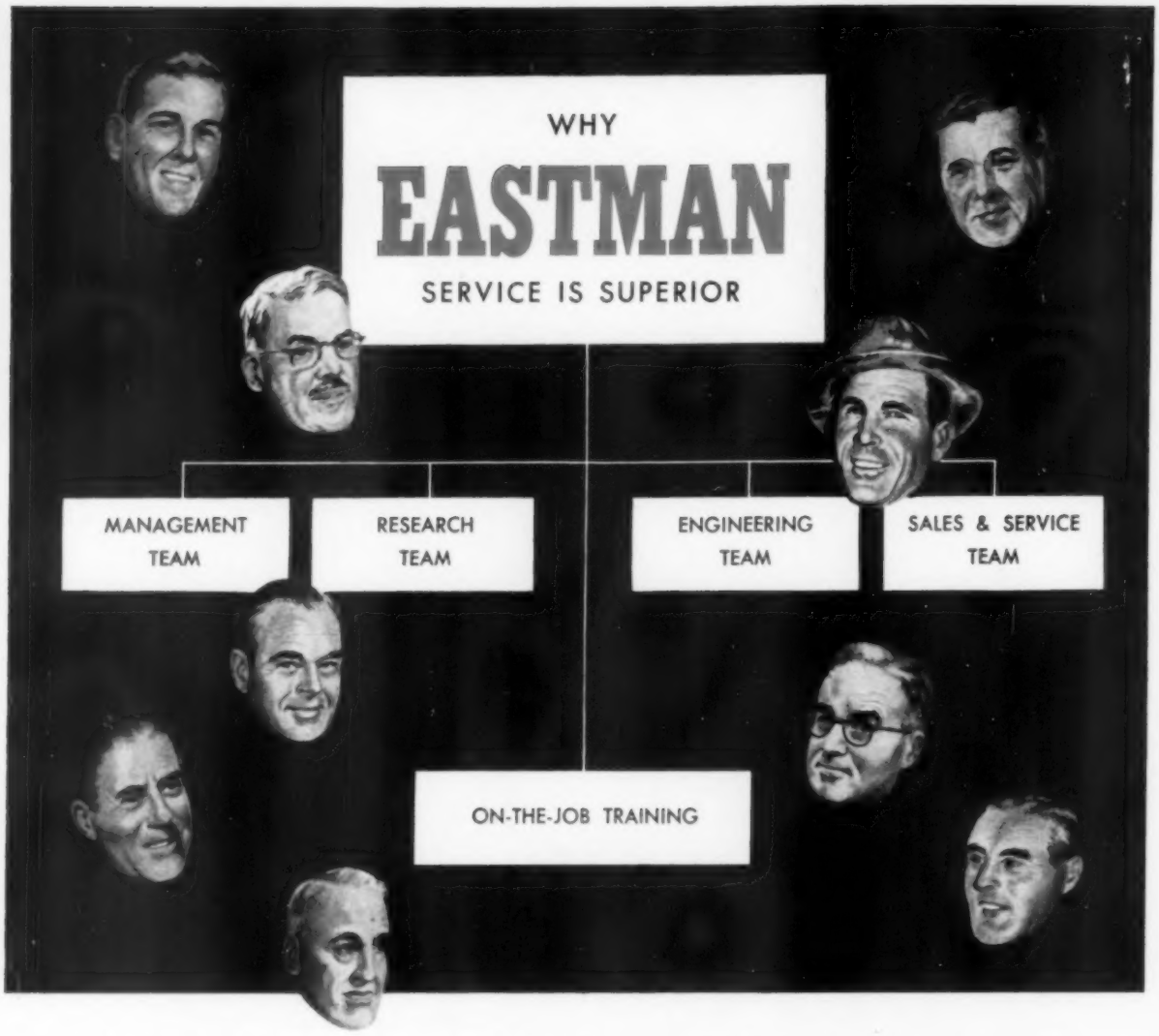

YEARS OF EXPERIENCE . . . ADVANCED INSTRUMENTS, TOOLS, METHODS, THESE DETERMINE THE DEGREE OF RESULTS AND VALUE FOR MONEY SPENT.

Each time you call on Eastman for service you not only have the advantage of highly skilled individuals but the collective experience and knowledge of a fully rounded out team — encompassing progressive management, research, engineering, sales and service and practical on-the-job training. Over 27 years of world-wide specialized service brings to you the most skilled and efficient performance available in Directional Drilling, Sidetracking and Oil Well Surveying.

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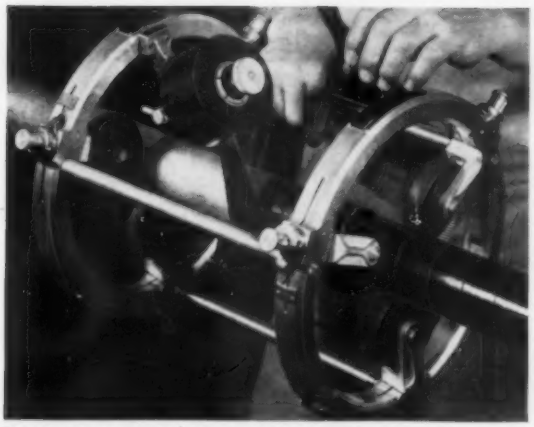
One of these three is the tape coating for you



Polyken No. 900—12 mils, the original all-inclusive tape coating for straight-run applications.

Polyken No. 920—20 mils, thick and tough for heavy-duty use on straight runs, yet it's conformable, too.

Polyken No. 940—12 mils, just the right balance between elasticity and super-conformability for use on irregular pipe structures.

Only if you use a *Polyken* polyethylene tape on *accessory* jobs are you getting the most for your money

Whatever your need in accessory tape coatings, you will find a *better* solution at *lower* cost with one of these Polyken tapes.

Top corrosion fighter

Why Polyken? Because only Polyken has successfully developed the complete line of polyethylene tape coatings. And no other tape coating—*absolutely none*—can match the remarkable properties of Polyken polyethylene:

- **tough and elastic**
- **unplasticized, non-drying film**
- **doubly thick adhesive to seal all voids**
- **far higher adhesion for a true bond to pipe surface**
- **lower water vapor transmission rate**
- **higher electrical insulation resistance**
- **better cold weather handling and durability**

Compare the cost of each Polyken tape with that of the competitive tape it surpasses in performance. Here is your Polyken distributor . . . contact him now.

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Long Beach 6, Calif.: Barnes & Delaney
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THE KENDALL COMPANY
Polyken Sales Division

WELL, CAP'N JOHN, I SEE THAT ROGERS IS SHIPPING OUT AGAIN. I VENTURE THEY'LL DISEMBARK AT SOME REMOTE LOCALITY.
AYE, MATEY, BUT WHEREVER THEY GET OFF YOU CAN BET THEY'RE READY FOR TOUGH GOING BOTH ABOVE AND UNDER THE BLASTED GROUND.

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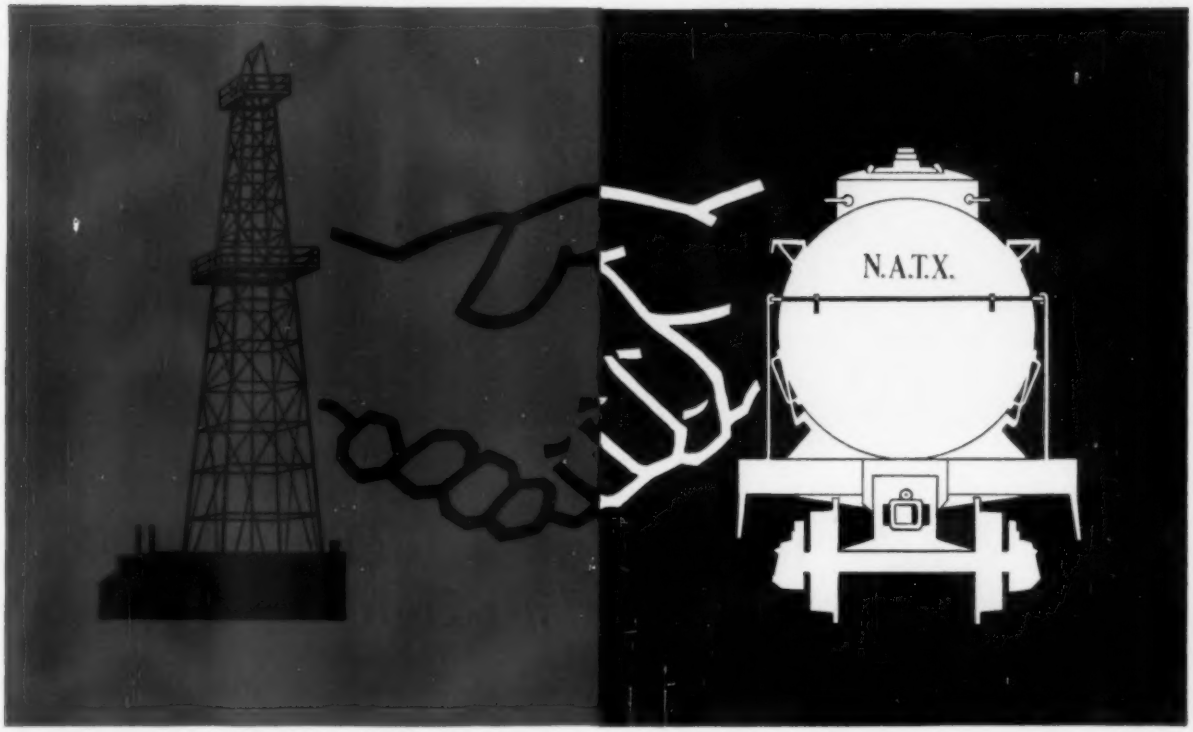

Among our first customers back in 1907 were shippers of petroleum products. In those days, as now, economy of bulk shipping by rail called for North American tank cars. Today the petroleum industry utilizes an increasing number of our 4,529 tank cars for safer, more dependable transportation. We are looking forward to another half century of partnership between the vital petroleum industry and progressive North American Car Corporation.
Call on us—*anytime.*

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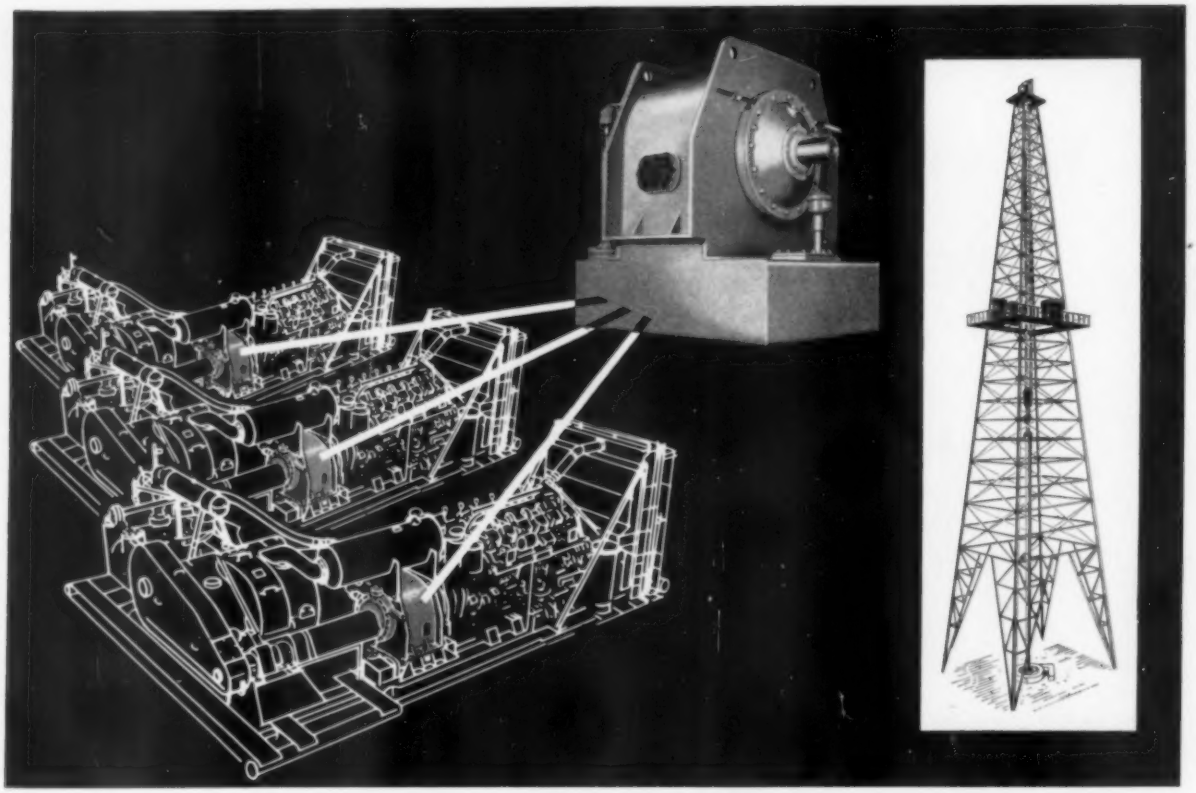
AMERICAN BLOWER *Gýrol*® FLUID DRIVE . . .



Class 2F, Type VS Gýrol Fluid Drive, 280 hp to 820 hp, speeds to 1200 rpm.

Here's how to provide smooth, stepless, adjustable power for oil-field operations

For smoother power transmission, with the cushioning effect of fluid flow . . . *stepless, adjustable speed . . . flexible pump control*, quickly and easily manipulated in compound-design setups . . . it will pay you to investigate the American Blower Gýrol Fluid Drive.

Draw Works—When hoisting and lowering drill pipe and casing, and for cathead and fishing operations, the Gýrol Fluid Drive provides smooth, protective acceleration—even from a standstill against a full-connected hoist load. It transmits maximum engine torque with minimum danger of engine stall.

Rotary—Gýrol Fluid Drive provides adjustable, stable speed to the rotary table. Its high-efficiency transmission utilizes maximum engine power. And when low, creeping speeds below minimum engine rpm are required, the Gýrol Fluid Drive will supply them without danger of stalling.

Slush Pumps—For smoother operation and maximum-efficiency power transmission between engine and slush pump, use the Gýrol Fluid Drive. When pressure and depth increase, and your engine reaches full load, the Gýrol Fluid Drive allows adjustable-speed pump operation while the engine operates in its most efficient range.

Call your American Blower branch office for full information, or write American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

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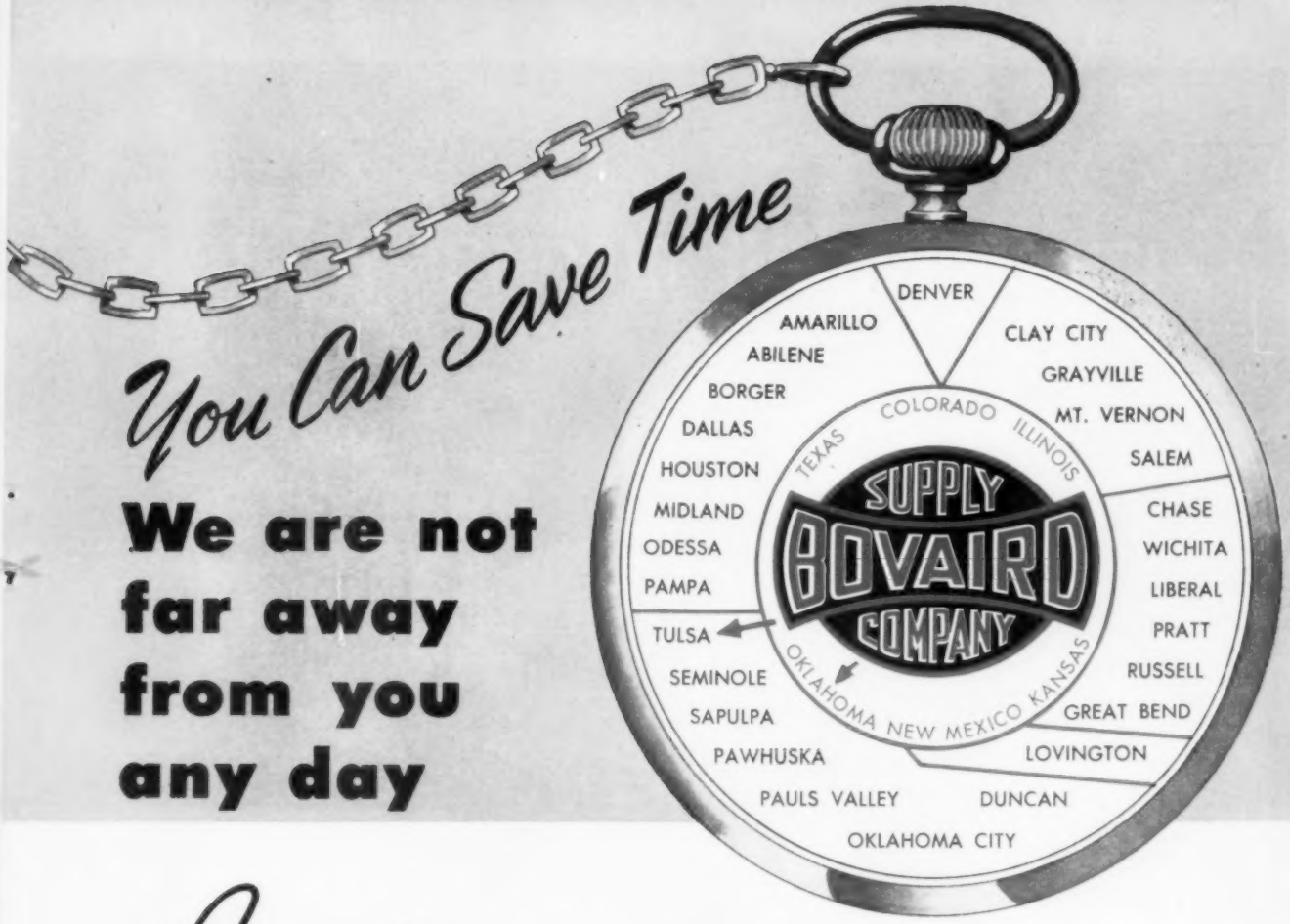
Division of **AMERICAN-Standard**

You Can Save Time

We are not far away from you any day



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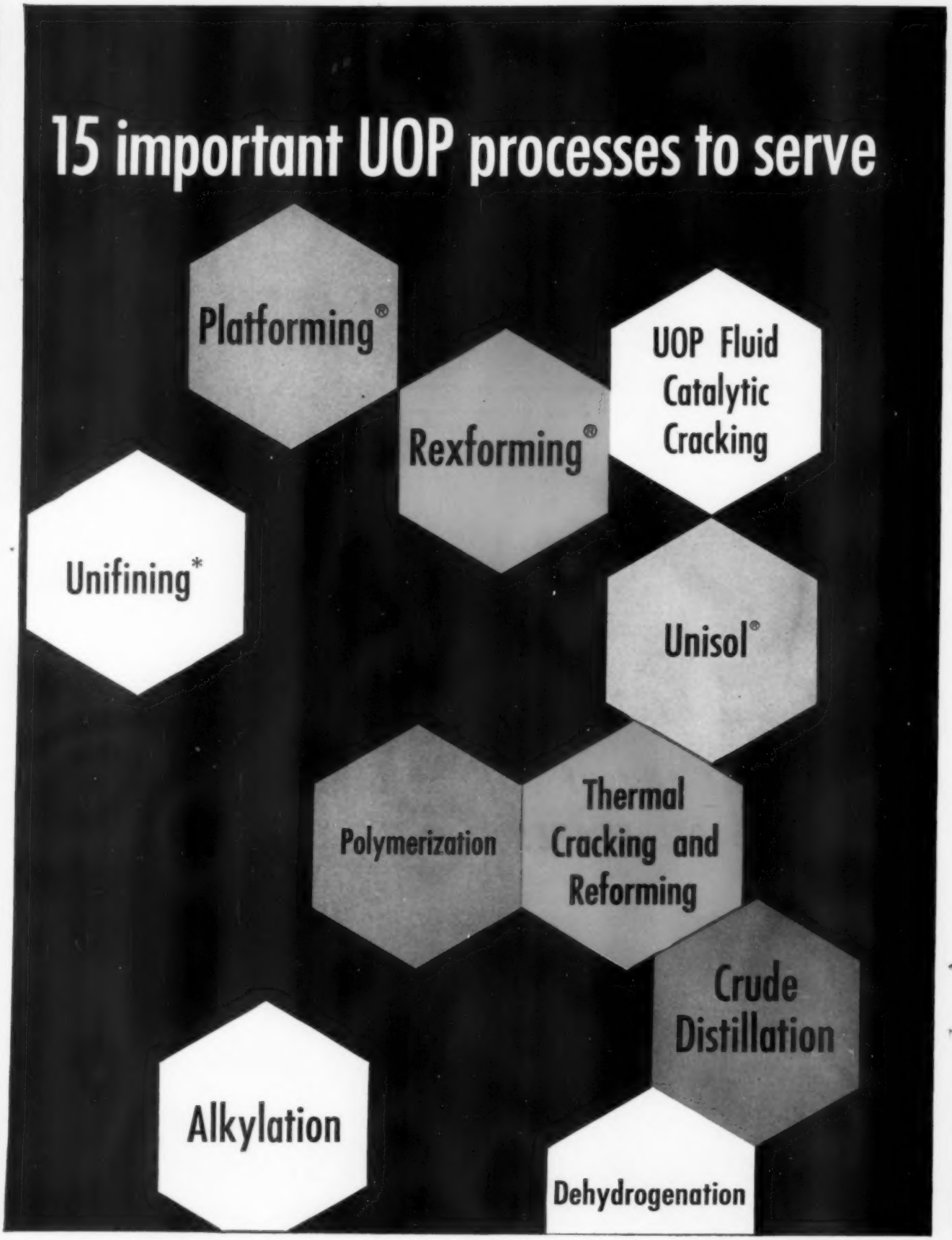
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Wherever you go, the world over, you'll find these UOP processes helping refiners do a better job.

The names displayed here identify some of the most widely used and best known refining and petrochemical processes made available to the entire petroleum industry by Universal Oil Products Company.

But mere process names and techniques do not indicate the full measure of their importance to the industry. What really counts is the ability to adapt the right processes to each individual refiner's needs.

UOP is not just in the business of developing and licensing refining processes. That's only the beginning. The big part of our job is helping the individual refiner make use of our modern developments to better his operating and economic position by producing a larger volume of high quality products from every barrel of crude he processes.

That's why UOP refining and petrochemical processes are highly flexible in design, in through-put, in product, tailored to the individual refiner's needs. That's why UOP carefully analyzes the economics of any process in relation to individual product and market requirements.

For more than forty years UOP has followed the policy of making sure that its developments are applicable, economically and practically, to their user's needs. Whatever the processing needs Universal will continue to serve the oil refining business well.

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More Than Forty Years Of Leadership In Petroleum Refining Technology

*Trademark

Low Pressure Coking

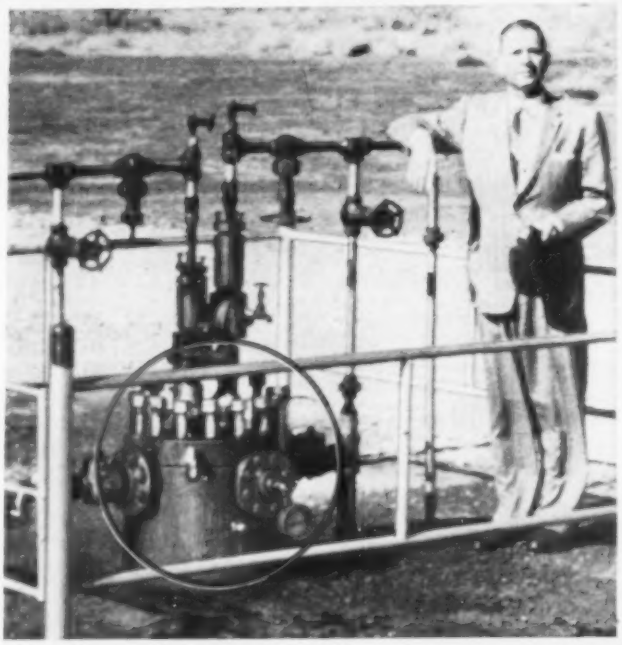
Catalytic Condensation

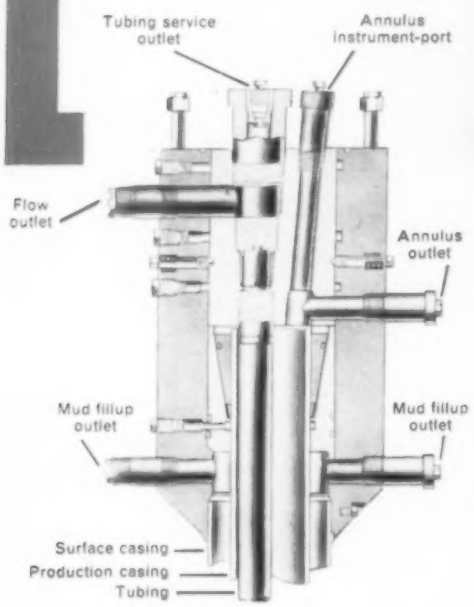
Compact-Safe-Low Cost!

COSASCO UNITIZED WELLHEAD

Dual wellhead and control tree only 22 inches in height!

Three strings of casing and two of tubing are suspended in this COSASCO Unitized Wellhead in West Texas. Both zones are being pumped hydraulically.





Here is a complete wellhead and tree in a single piece of forged steel! It is the most compact, safest, most economical of all wellheads. It is available for single or multiple completions, with or without annulus entry for instrument work, and with gas lift, as required.

Since all outlets and tubing hangers are equipped with COSASCO *Access* Fittings, blowout equipment never needs to be removed during drilling or completion. This assures positive control of the well at all times.

Low original cost; fewer flanges, bolts, nuts, ring gaskets and valves; less standby and rig-moving time; easy conversion to pump; freedom to service one zone of a dual well without interfering with the other... these are just a few of the advantages which COSASCO Unitized Wellheads provide.

What are your well-control equipment needs?

Want built-in safety and positive control during drilling and well completion? Want compactness and simplicity in your control tree? Want to be able to remove valves and other externals regardless of pressures encountered? Want to put one zone on pump without disturbing the other? WRITE, giving full details of operation, and we'll furnish drawings and quotations to show how your requirements can be met. YOU WILL BE UNDER NO OBLIGATION WHATSOEVER FOR THIS SERVICE.

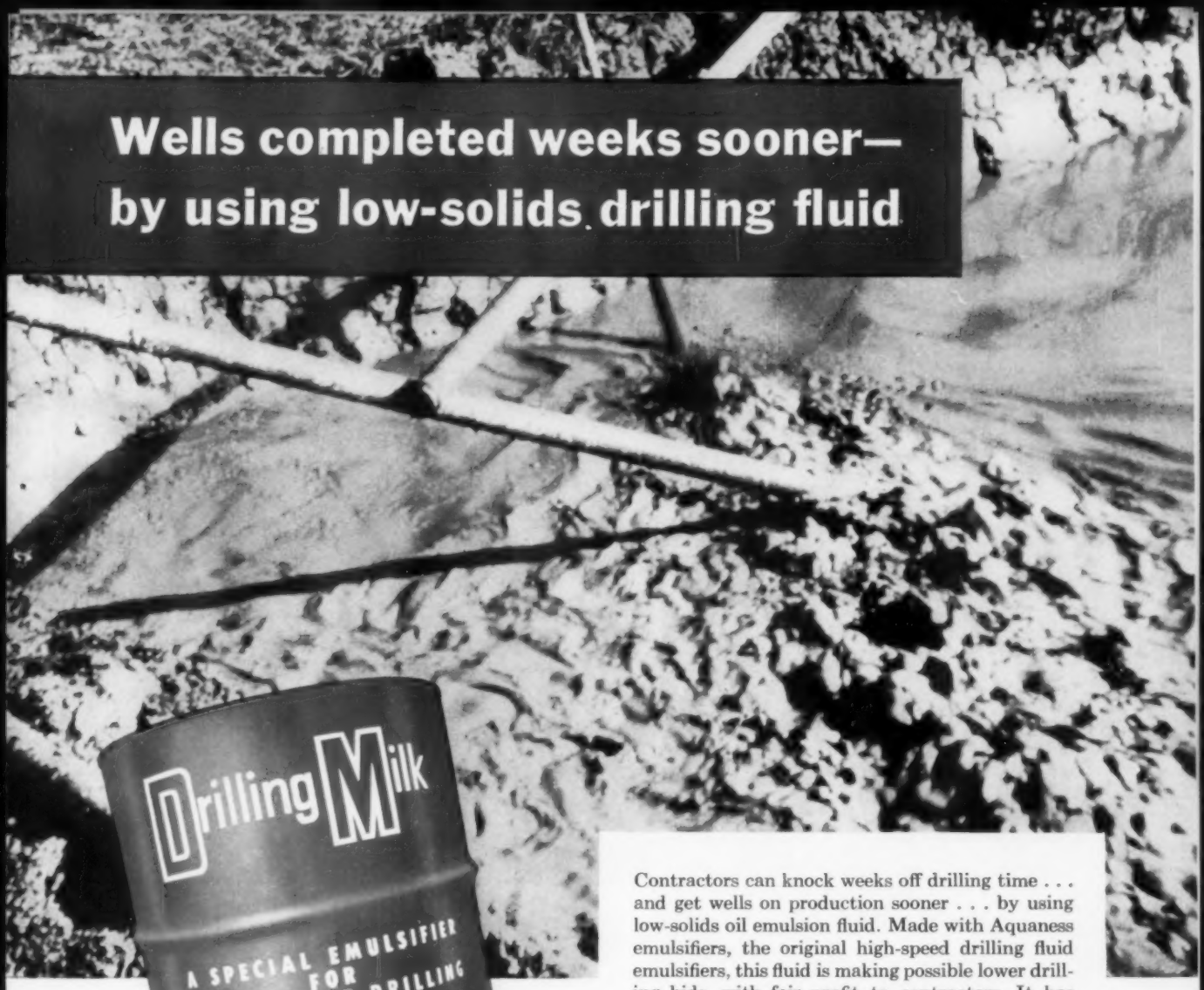
Protect equipment...Save product

COSASCO

DIVISION OF PERFECT CIRCLE CORPORATION

11655 McBean Drive, El Monte, California
EXPORT OFFICE: 3631 Atlantic Ave., Long Beach 7, California

Wells completed weeks sooner— by using low-solids drilling fluid



Contractors can knock weeks off drilling time . . . and get wells on production sooner . . . by using low-solids oil emulsion fluid. Made with Aquaness emulsifiers, the original high-speed drilling fluid emulsifiers, this fluid is making possible lower drilling bids, with fair profit to contractors. It has been used with outstanding results in over 500 wells.

PENETRATION RATES INCREASED. Tests on offset wells show low-solids fluid boosts penetration rates from 26 to 41%.

TRUER GAUGE HOLE DRILLED . . . less cement required.

MUD CONTROL SIMPLIFIED. Solids drop out quickly. No foaming. Minimum mud service. Mud flows like water; viscosity can be easily controlled. Faster mud conditioning.

LOST CIRCULATION REDUCED. Weights are lighter; pressures are lower.

LARGER CUTTINGS. Better for geological analysis.

SALT AND AIR CORROSION RETARDED by excellent inhibiting properties of this fluid.

ASK YOUR MAGCOBAR DEALER ABOUT DRILLING MILK*

. . . or write to Magcobar about this emulsifier for low-solids fluids.

*Trademark Magnet Cove Barium Corporation.

LOOK FOR THE AQUANESS SEAL

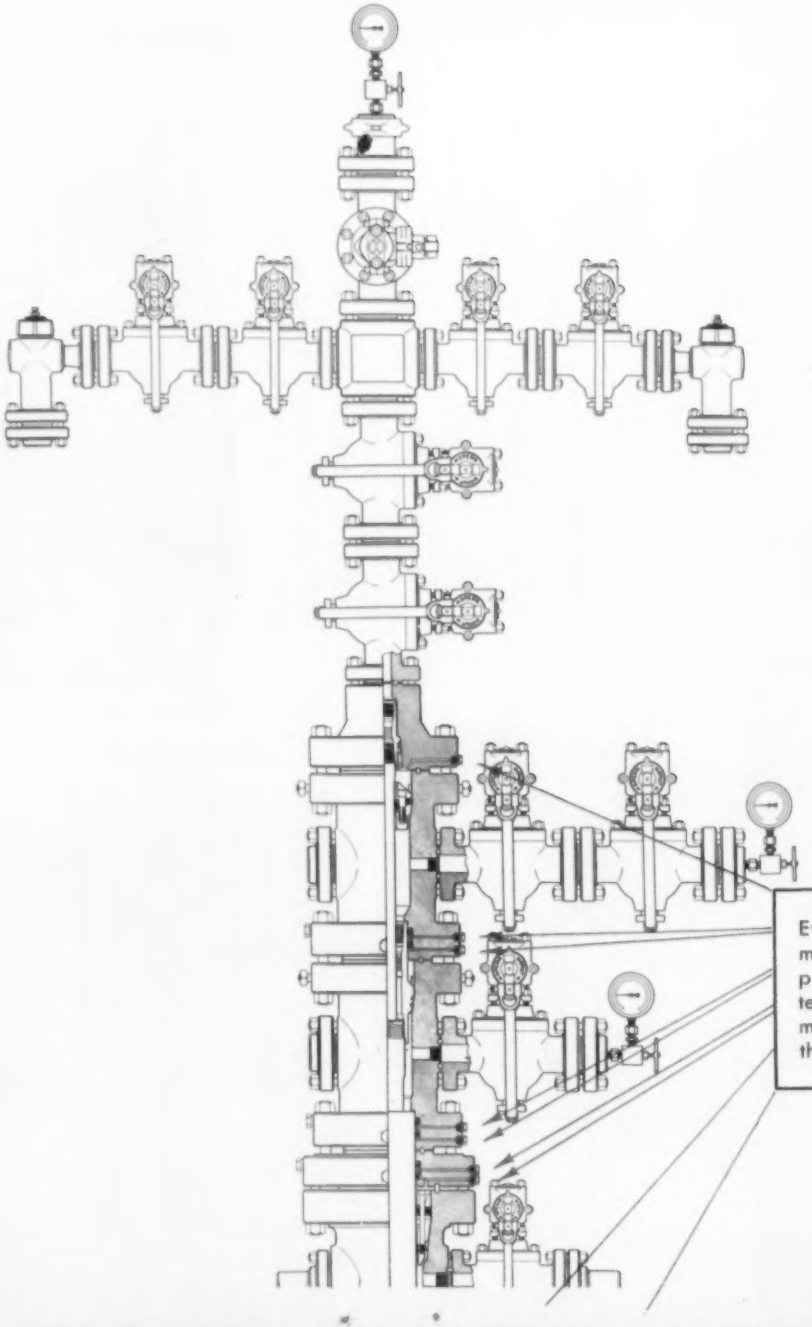
It identifies the **original** *low-solids, high-speed drilling fluid emulsifier, made by Aquaness for leading mud companies.*

ATLAS

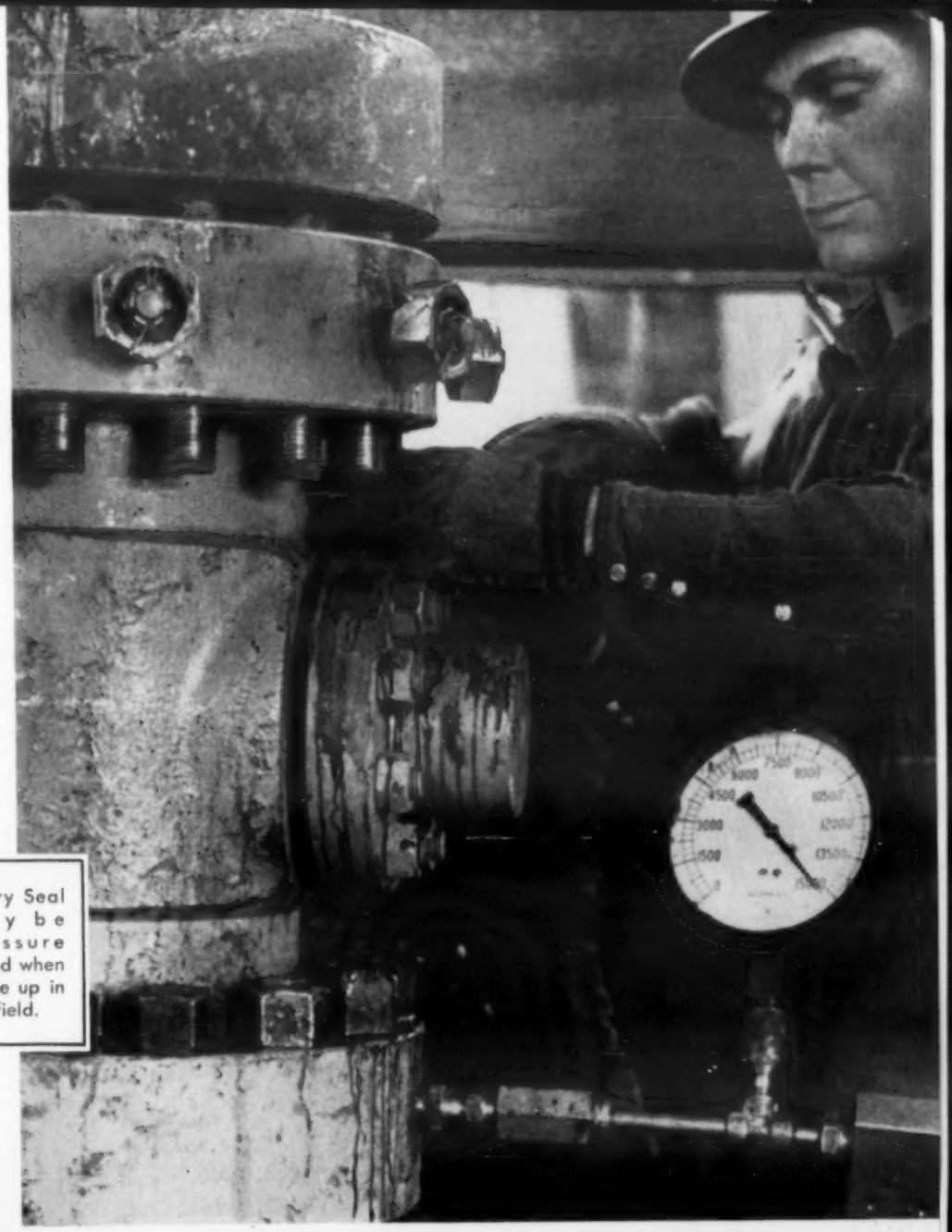
Aquaness *Department*

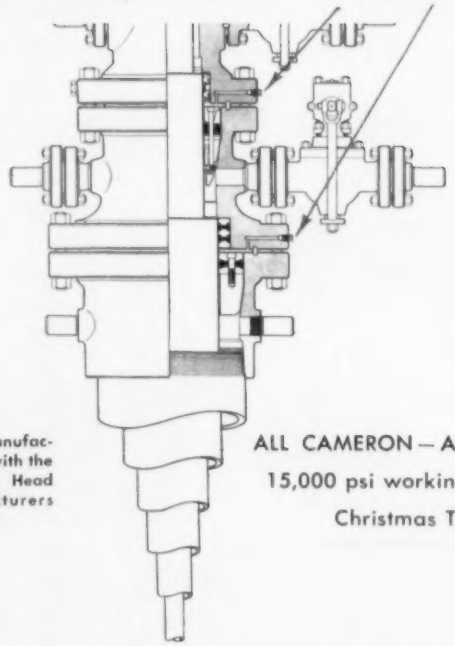
ATLAS POWDER COMPANY

2005 Quitman Street, Houston 26, Texas



Every Seal may be pressure tested when made up in the field.





All seal rings are manufactured in accordance with the Association of Well Head Equipment Manufacturers specifications.

ALL CAMERON — ALL FORGED
15,000 psi working pressure
Christmas Tree

IN TREES
HIGH PRESSURE REQUIRES
HIGH QUALITY

SAFETY:

YOU HAVE FORGED ALLOY STEEL FOR STRENGTH. YOU MAY TEST EVERY SEAL AT WELL ASSEMBLY.

ECONOMY:

YOU MAY CHOOSE FROM A COMPLETE DESIGN RANGE FOR ANY WELL . . . SINGLE, DUAL OR TRIPLE.

Cameron Quality begins with design – advanced design which permits testing of every pressure seal at installation on the well.

Quality alloy steel for Cameron trees is produced under strict supervision in Cameron's huge modern melt shop.

Quality control follows these trees through every phase of manufacture – from forging and machining to assembly and final testing.

Quality makes the difference—that's why Cameron field proven trees set the standard in oil producing areas throughout the free world.

For high or low pressure—single, dual or triple trees of unequalled quality, write or call:

Cameron
IRON WORKS, Inc.
P. O. Box 1212-Houston, Texas
Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works Ltd., Time & Life Bldg., New Bond Street, London W. 1 England

Here's Why . . .

Silicone Insulation Offers New Economy For Outdoor Motors

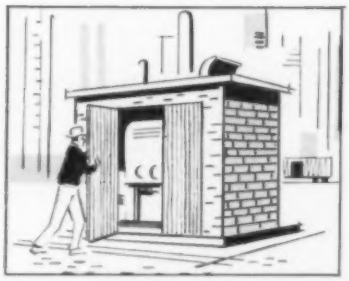
Silicone insulation is establishing a trend towards less costly enclosures for outdoor motors. By readily withstanding moisture and contaminants circulated in ambient air, silicone insulation makes possible more open enclosures and lower motor cost per horsepower.

Several leading electrical equipment manufacturers now offer a line of silicone-insulated "all-weather" motors in most large horsepower ratings.

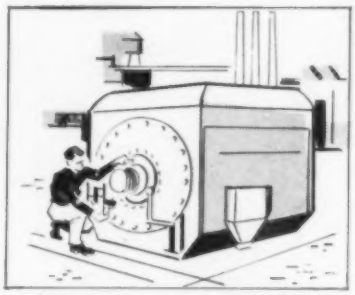
Safe, reliable operation outdoors the year 'round is assured by Dow Corning silicone insulation. Experience has shown silicone-insulated motors readily withstand torrential rains, hurricane winds, corrosive fumes, wind-driven dust, snow, sleet, cold and heat.

Long insulation life is assured by the water-repellent silicone-insulated windings that survive even flooding. Silicone insulation on motors, generators and transformers provides up to 50% greater service factor for absorbing overloads, adds immeasurably to reliable operation and increases insulation life 10 times or more. That's why it's wise to—

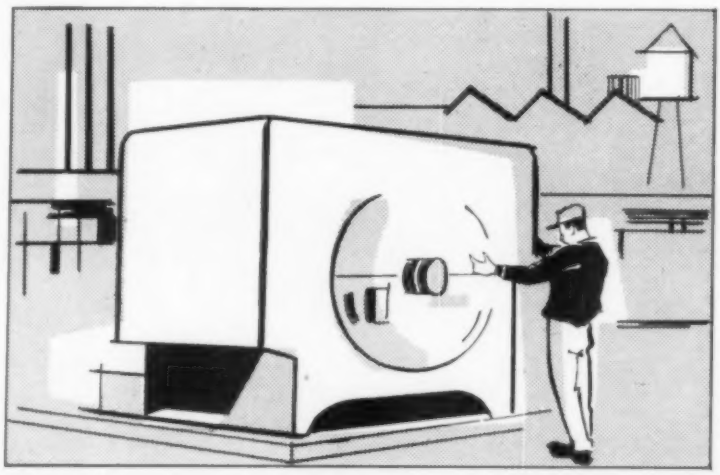
SPECIFY DOW CORNING SILICONES *and Save*



Initially, motors were sheltered in buildings . . .



Later, motor enclosures themselves sealed out surrounding atmosphere



Now, silicones protect motor parts permitting the circulation of ambient air and lower-cost enclosures.

first in silicones

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MIDLAND, MICHIGAN

Atlanta • Boston • Chicago • Cleveland • Dallas • Detroit • Los Angeles • New York • Washington, D. C.

By B. R. Dixon,
Johnston Testers

FOR MORE INFORMATION AT THE BOTTOM OF YOUR WELL

Important points on double shut-in pressures

"What is the main advantage of double shut-in pressure readings?" That's a question often asked by those who have not yet tried this newest method of drill stem testing.

Actually there are four main advantages of the double shut-in pressure method:

1. Maximum formation pressure build-up in shortest time.
2. Comparison of reservoir build-up pressures before and after test.
3. Two separate chances to obtain reservoir pressure.
4. The measuring of the true equilibrium pressure prior to producing the formation provides a virgin pressure measurement and more accurate data.

Perfected by Johnston Testers, this new technique requires only a simple rearrangement of the test tool assembly. By placing a valve above the main or hydraulic valve, a specified volume of air is trapped between these two valves. This volume of air is called the "air chamber."

As the purpose of the air chamber is to relieve the mud pressure trapped below the packer, the secret of success of double shut-in testing is accurate use of this air chamber. Best results have been obtained when volume of the air chamber is about 10% of the volume of mud below the packer.

In the past, it has been common to calculate the air chamber to the nearest 30-foot pipe length. This lack of accuracy has often caused a failure to record the maximum initial shut-in pressure.

To overcome this problem, and to do away with complicated mathematics, Johnston has developed an "air chamber alignment chart." By simply drawing straight lines between known figures, the amount of air chamber needed can be calculated quickly and accurately.

Complete information on double shut-in testing is available from Johnston Testers, Houston, Texas. Write today for complete descriptive folder.

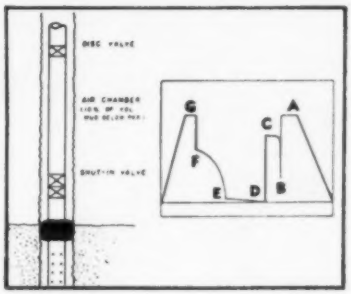


Figure 3
Testing tool assembly for double shut-in pressure readings which permits a limited fluid withdrawal. By placing the disc valve above the main or hydraulic valve so that a specified volume of air is trapped between these two valves.

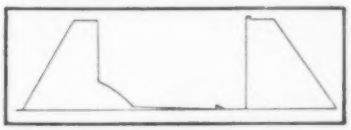


Figure 4
Well not capable of producing fluid fast enough to fill up air chamber and cause pressure build-up.

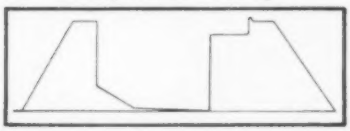


Figure 5
Mud did not expand enough to get pressure draw-down below the formation pressure.

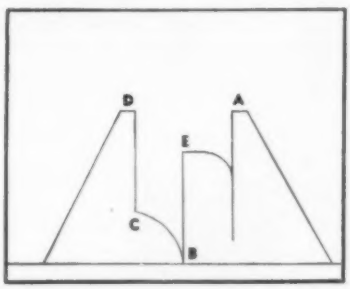


Figure 1
Example of a chart on an interval that has good permeability. The initial shut-in shows the formation pressure before the reservoir has been disturbed. The rapid build-up of the flow curve from "B" to "C" indicates rapid entry of fluid into the drill pipe. In this case the formation gave way allowing the hydrostatic pressure to stop the test. If the initial shut-in had not been taken another test would have been necessary in order to determine the reservoir shut-in pressure.

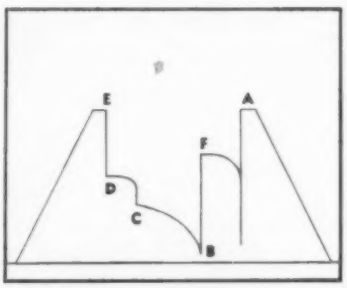


Figure 2
Example of a test in a very small reservoir. The initial shut-in pressure indicates a good initial pressure and the flowing curve shows good recovery, yet the final shut-in curve has almost leveled off to a point much lower than the initial reservoir pressure. This indicates that the reservoir is very small and even the short producing time of the drill stem test has partially depleted it. A follow-up test of the same interval is advisable.

B. R. Dixon, M.E.
Sales Engineer
Johnston Testers
Dallas, Texas

JOHNSTON TESTERS

A Subsidiary of Schlumberger Well Surveying Corporation

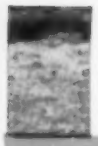
first in drill stem testing

HOUSTON, TEXAS

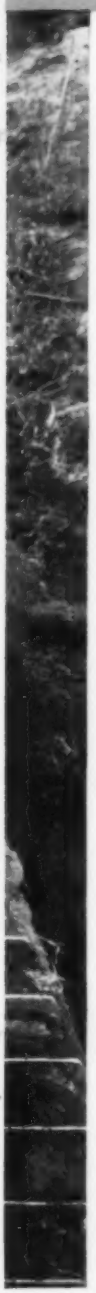
LOS ANGELES, CALIF. CALGARY, CAN.

FORMATION AND CASING TESTING
JOHNSTON

Here Basinger's HD-6 backfills a slush pit. Operator Tevebaugh says, "I can't say enough about this machine. It's tops."



"Best tractor I've ever used—a 'lifesaver' in emergencies"



. . . *says Oklahoma contractor*

"In fourteen years of oil field dirt moving, I haven't used anything that matches my new Allis-Chalmers HD-6 tractor-dozer. It moves more dirt, clears timber and builds roads faster, and it's a real 'lifesaver' in emergencies," says A. E. Basinger, Bartlesville, Oklahoma, oil field contractor.

"If a well busts out we've got to dig a new slush pit to catch all the oil or salt right away—no matter what the time or weather. That's when this HD-6's big output really pays off. Another thing, with that direct electric starter, it's ready to go in seconds."

Says veteran operator L. B. Tevebaugh, "This tractor's the best I've ever operated. It starts fast, handles easy, won't kick back in the rough spots. Seat's comfortable, brakes are good. It's so well balanced I can operate in places I couldn't work a tractor before. On hillside diggin' for a rig site, the tilt blade helps me level up in half the time.

"Another thing with the Allis-Chalmers setup, I don't waste a lot of time greasing idlers and sprockets. I sure wouldn't want to go back to the old way."

Basinger's HD-6 digs and fills about 100 slush pits a year. It also builds roads and creek crossings, digs ditches, levels well sites, clears timber, moves heavy machines and tanks.

Find out how Allis-Chalmers crawlers can pay off on your leases. Your nearby dealer can give you the facts. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

Diaphragm failures like this were eliminated by switching to neoprene

"Our emulsion treater valve diaphragms virtually never fail since we switched to neoprene," says Mr. A. I. Sellars, Chief Engineer, Maloney-Crawford Tank & Manufacturing Co., Tulsa.

Diaphragms in the valves of emulsion treaters take a beating chemically and physically. They are constantly exposed to oil, salt water and sulfur-laden gases at temperatures up to 170° F. And they must open and close continually as the well pumps. Once this meant trouble for Maloney-Crawford, makers of emulsion treaters.

"We tried several diaphragms of oil-resistant rubbers," reports Mr. Sellars. "They seemed to get hard and fail in a month or so. We did a brisk, and rather costly, replacement business much to our sorrow. Then we started using neoprene. In a year, our replacements fell off to nearly nothing."

Rugged neoprene—Du Pont's synthetic rubber—has a wide range of use in oil field equipment because it can take this kind of punishment. It resists sunlight, weathering and aging . . . oil and grease . . . abrasion and flex cracking—just about everything encountered in oil patches. So when you buy oil field rubber products be sure to specify the rubber with long, trouble-free service life: Du Pont neoprene.

This used to be common. Mr. Sellars shows how previous diaphragms, made of other synthetic rubbers, used to harden and fail—usually in about one month. Since neoprene diaphragms were substituted, "replacements have fallen off to nearly nothing."

NEOPRENE

MADE BY DU PONT FOR 25 YEARS

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . through chemistry

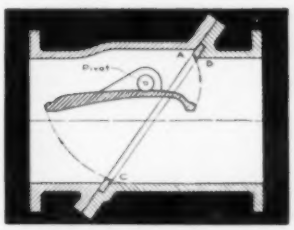
You have to see it to believe it...

(You Can't Hear It!)

CHAPMAN Tilting Disc Check Valve

It's the silent valve. No noise, no vibration, no fluttering. On usual piping arrangements you get no slamming with a Chapman Tilting Disc Check Valve. You get no banging to cause damage to system or valve . . . no grinding, scraping or wearing of either the disc or seat. Your maintenance costs go down to an unbelievable low which is really something to see and enjoy.

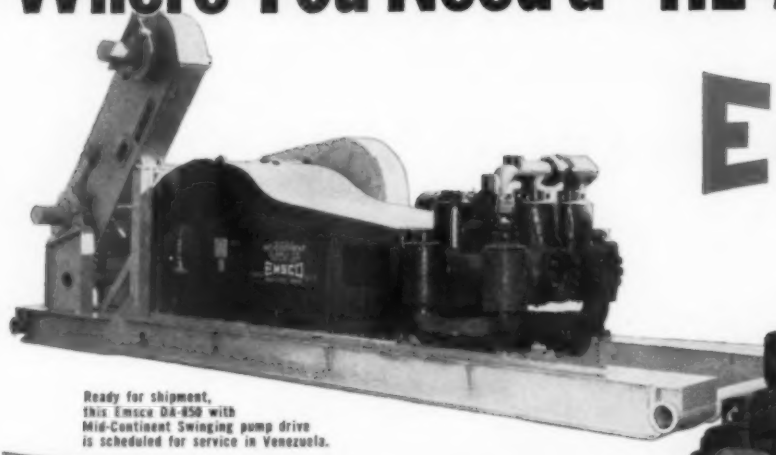
You can safely use these valves under tough operating conditions. You can order them in iron and steel . . . for handling fluids or gases under a wide range of pressures. You can get them fast. See our Catalog 30-A. Write for your copy today.



Look at this operational chart. When the flow is on, "airfoil" disc is held firmly against stops in the body. When the flow drops, disc balances quietly on whatever flow there is. When flow stops, disc drops quickly, quietly and firmly on special bevel seat. Note that sufficient space is designed around disc to cut down flow resistance.

THE CHAPMAN VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASSACHUSETTS

Where You Need a "HE-MAN" Pump



Ready for shipment, this Emsco DA-850 with Mid-Continent Swinging pump drive is scheduled for service in Venezuela.

EMSCO DA-850

INSTALLATION ENGINEERED

by MID-CONTINENT

You get *more* with an Emsco DA-850 from Mid-Continent. Expert installation engineering is available to help you get top pump performance. Mid-Continent's field parts stocks simplify your field operations. Mid-Continent's around-the-world equipment supply is always near, wherever your location — the muskeg of Canada, offshore Louisiana, or Venezuela. Call your Mid-Continent man for complete mud pump information.

FIELD-PROVEN FLUID END DESIGN INCREASES EFFICIENCY; SIMPLIFIES MAINTENANCE

THREADED VALVE POT COVERS field proven over eight years permit quick and easy access to valves.

EXPOSED LINER CONSTRUCTION field proven over fifteen years. Lessens possibility of fluid end washouts.

STEEL FLUID END is composed of steel castings electrically welded into integral units for maximum strength and minimum weight.

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100 pounds of Davison Silica Gel adsorbs 1.5 to 3.0 gallons of hydrocarbons at 80% recovery efficiency

Why lose valuable hydrocarbons suitable for sale as gasoline, when you can recover them so easily with Davison Silica Gel?

This desiccant has high capacity for moisture and hydrocarbons, so minimum size equipment does the job. You'll find, too, that Davison Silica Gel is readily reactivated . . . gives low dewpoints . . . resists fouling . . . gives low pressure drop . . . is hard, tough, non-dusting and non-corrosive.

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Division of W. R. Grace & Co.

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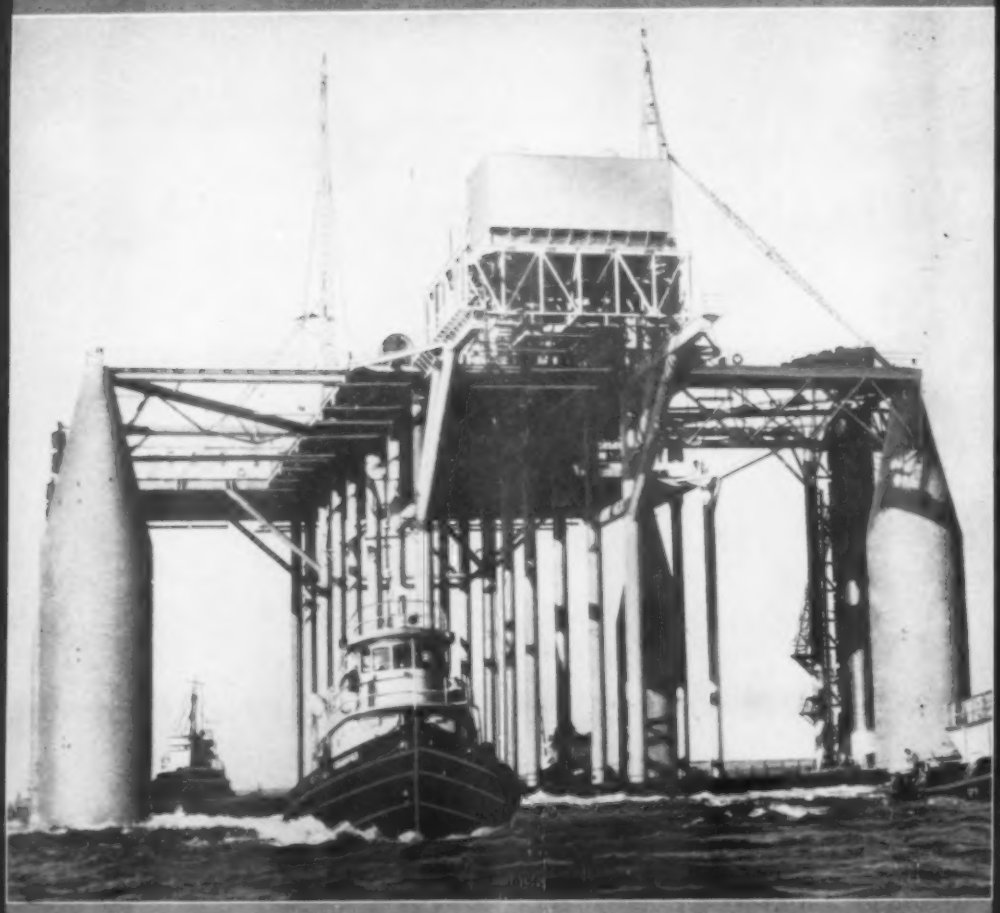

KERMAC 46, built by INGALLS for Kerr-McGee Oil Industries, Inc., to take the search for oil into offshore waters up to 70 feet deep. The Kermac 46 is stabilized by a maze of pressure tubes . . . and it is one of the largest submersible oil drilling platforms ever to go to sea.

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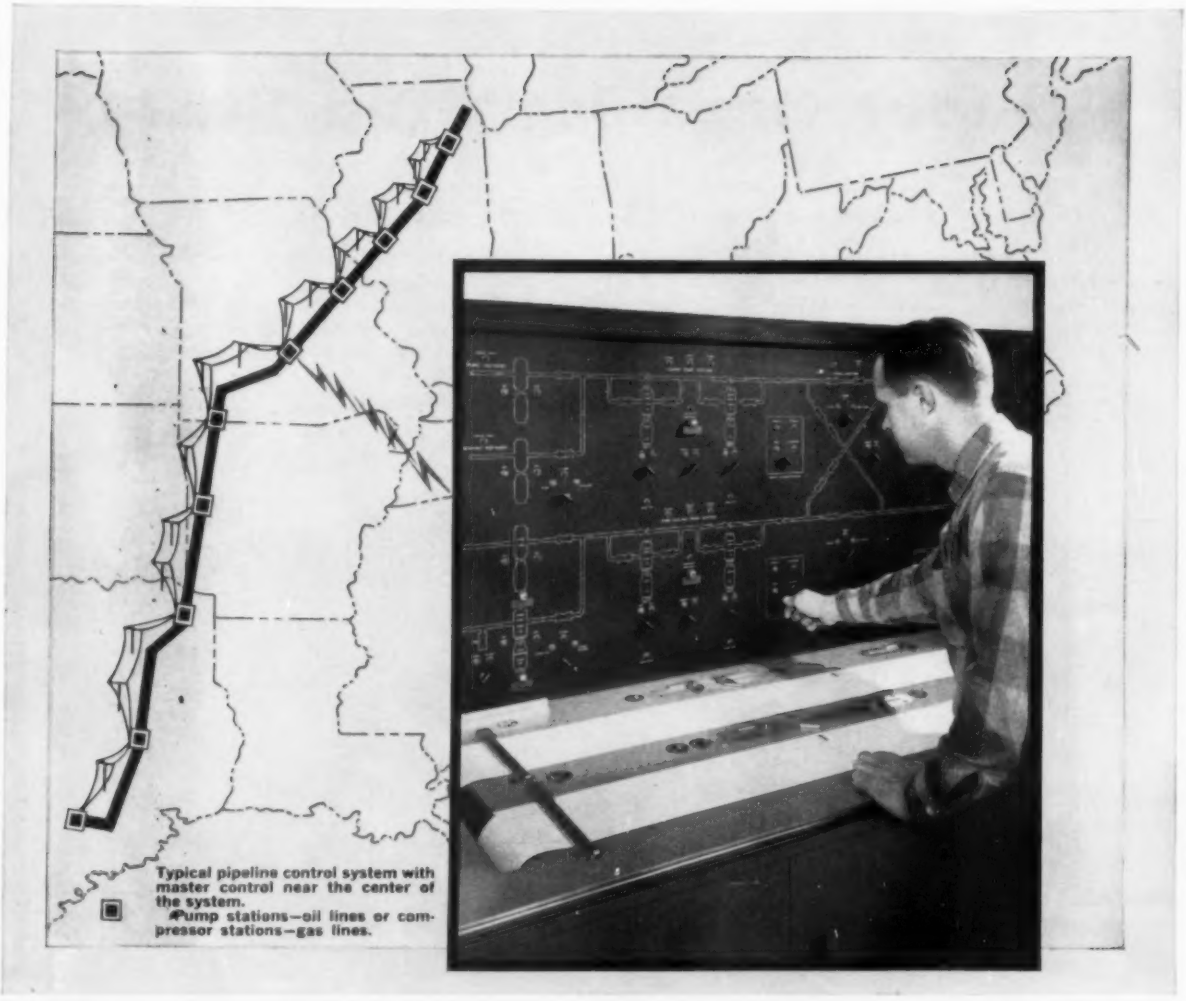

Typical pipeline control system with master control near the center of the system.
Pump stations—oil lines or compressor stations—gas lines.

UNION CTC means a complete Centralized Transport Control System

When you want a *complete* pipeline control system of any desired length, specify UNION CTC. Our engineering is based on the *systems design approach*, and Union Switch & Signal is prepared to take responsibility for integrating the entire control system. This includes communications, instrumentation, telemetering, and sequence control integrated into the one CTC system.

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UNION CTC provides more efficient dispatching and more effective control of through-put with considerable reduction in operating costs. It is *not* an expensive luxury . . . it is a profit earner.

If you are planning a new pipeline or modernizing an old one, Centralized Transport Control offers definite advantages. It can be used for gathering systems, tank farms and offshore applications. Write for our Bulletin No. 1052.

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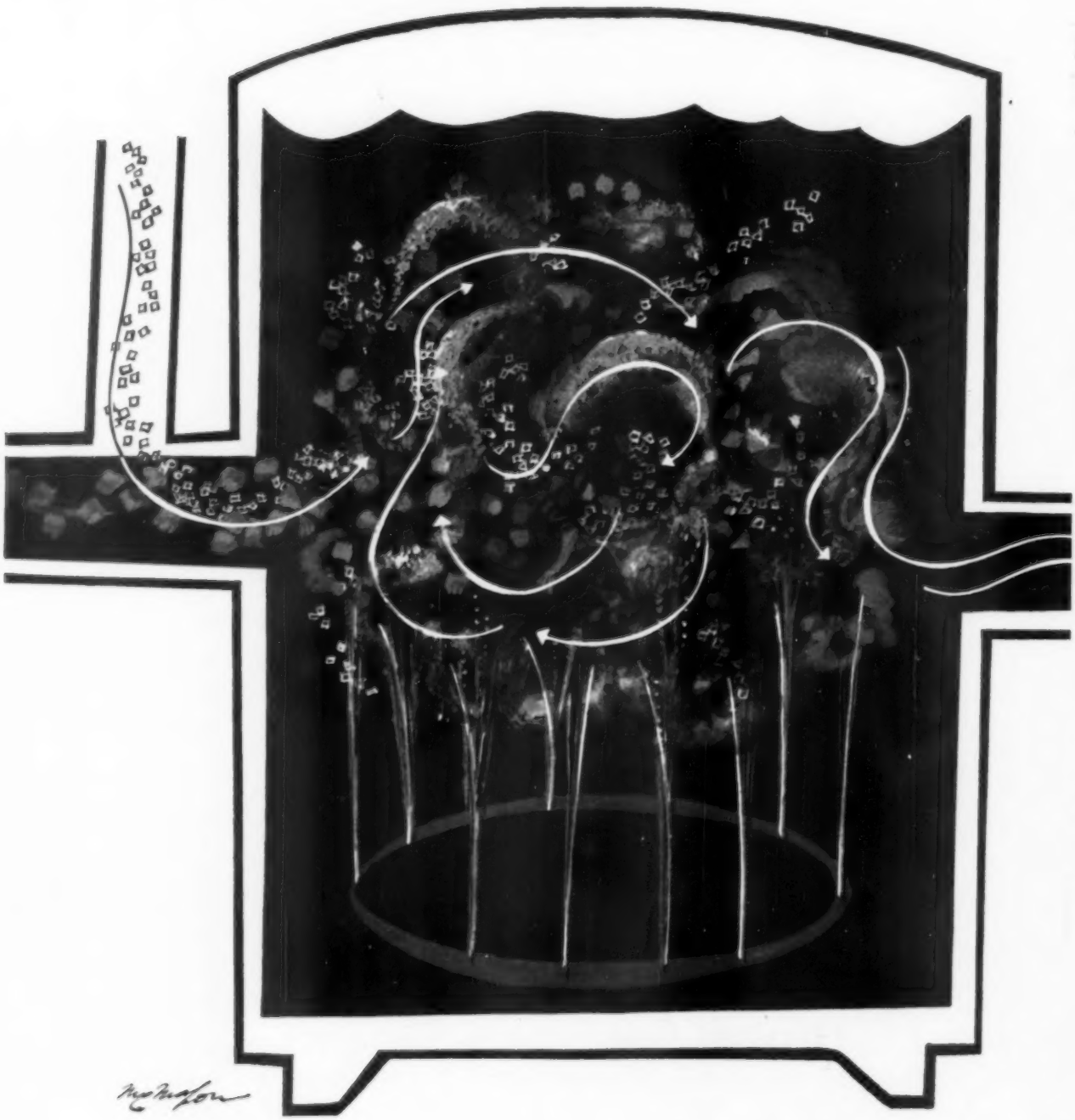


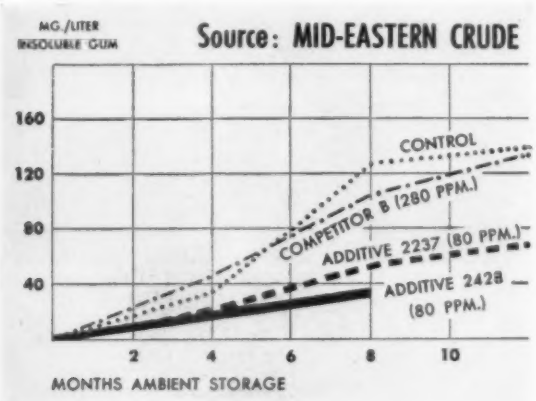
Here is a unique group of polar organic surface active chemicals that meet the toughest industry requirements for fuel additives. They can be important to you because:

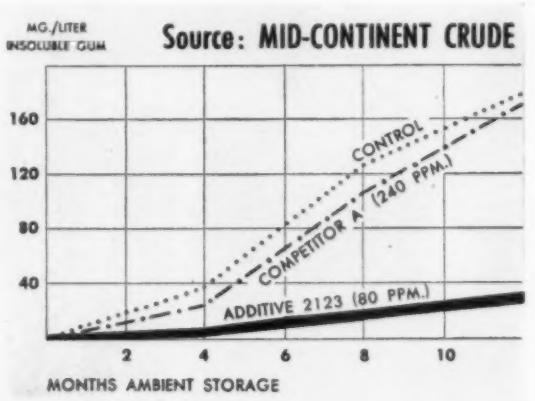
(1) Insoluble gums can now be effectively solubilized or inhibited for as low as *1¢ per barrel.*

(2) Filterability and color stability can be controlled to meet the strictest "specs." Unstable furnace oils, which previously caused filter plugging in burner operations and exhibited color degradation, are no longer a problem when Armour additives are used.

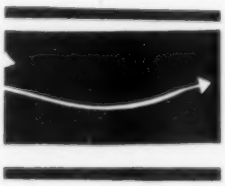
ARMOUR PRODUCTS EXCEL IN 12 MONTHS STORAGE TESTS

Four fuel oil stocks (West Texas, Mid-Continent, Venezuelan and Middle East types), have been subjected to 12 months ambient storage conditions using 41 potential additives. These 41 additives resulted from the screening of over 300 chemicals. Four Armour products (3 graphically shown below) were outstanding in their ability to inhibit and/or solubilize gum and stabilize against radical color change. In addition, most effective for West Texas crudes was Armour Additive #2528; for Venezuelan crudes, Additive #2237.





OTHER REFINERY APPLICATIONS



Even the most rigid specifications for stabilization and corrosion inhibition of gasoline, diesel and jet fuels can be met by adding Armour chemical additives.

Armour polar organic surface active agents have the innate ability to adsorb onto metal surfaces, rendering such surfaces hydrophobic. When used in lubricating oils and greases, this property, plus superior lubricity and corrosion protection, assures longer machine life. In addition, this adsorption characteristic also helps inhibit corrosion and fouling in operational equipment.

The Armour Chemical Division is ready to help you utilize the proper additive for your special situation. Let our trained staff assist you by recommending the Armeen® or Duomeen®, or one of their derivatives, specifically designed to solve your problem.

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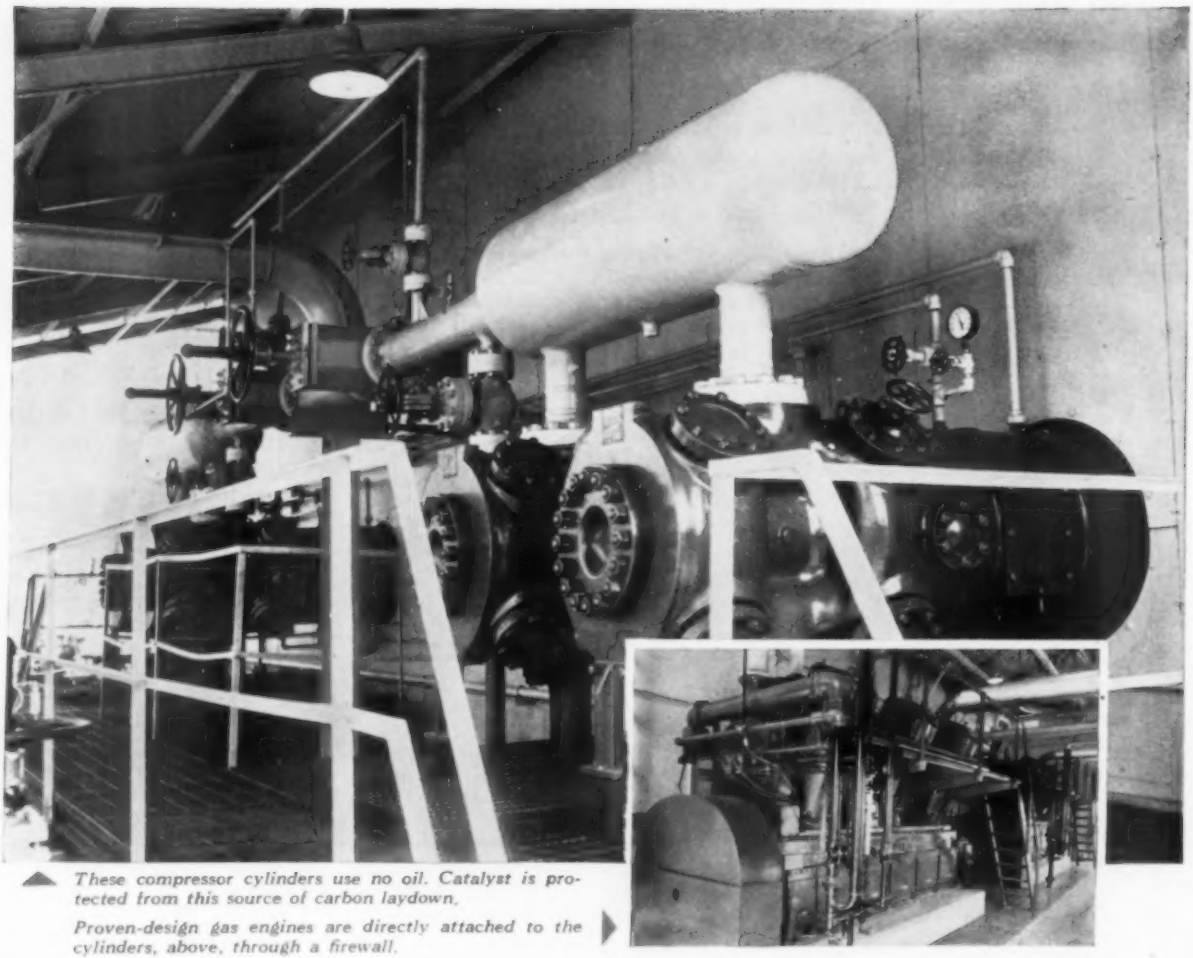

These compressor cylinders use no oil. Catalyst is protected from this source of carbon laydown.

Proven-design gas engines are directly attached to the cylinders, above, through a firewall.

CATALYST LASTS LONGER

with NL compressor cylinders

No oil to carry over in the recycle gas

One feature of the Platforming process, developed and designed by Universal Oil Products Company, is long catalyst life without regeneration. That means a low catalyst cost per barrel of high-octane gasoline. That's why Skelly Oil Company's Platformer at El Dorado, Kansas, uses Ingersoll-Rand compressors with 'NL' non-lubricated cylinders.

In NL cylinders there is no oil to carry over in the recycle gas into the catalyst-packed reactor. Presence of oil would result in carbon laydown (coating which renders catalyst inactive). Oil also causes excessive hydrocracking and formation of undesirable polymers.

The pistons of NL cylinders are supported by graphitic carbon rings sliding in a mirror-smooth bore. Operation is dependable without oil lubrication.

Cylinders are connected to the gas-engine frame by special two-compartment distance pieces that are sealed and vented to allow safe handling of the hydrogen-laden gas.

The two 660-hp KVG compressors handle a total of 73 million cubic feet of gas a day, boosting pressure from 450 psi to 610 psi. Using available gas, their four-cycle, V-angle engines produce low-cost power at all loads.

Ask your I-R representative for complete information on Ingersoll-Rand gas-engine compressors and non-lubricated compressor cylinders. Obviously standard oil-lubricated compressors should be used wherever possible to reduce first cost and maintenance.

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Positive remote supervisory control of pump motors and valves

Two complete packaged remote control systems are now available for application to distant motor operated valves and electric pump motors. Gardtrol Valve and Pump Motor Monitors provide constant monitoring and positive, non-ambiguous indication of "on", "off", "open", "closed" and "stopped" conditions at remote stations. Both units feature simplified design—three components, a control unit, field unit and single wire transmission line provide efficient, economical controlling. Exclusive Gardtrol circuit utilizes the cyclically-reversing polarity of alternating current to effect both control and supervision over one wire. Distance is limited only by the resistance of the signal wire.

two packaged units

GARDTROL VALVE MONITOR
opens, closes or stops valves in any position

GARDTROL PUMP MOTOR MONITOR
indicates off, on, and stops motors

Call or write your nearest Shand and Jurs office for specifications and prices.

SHAND AND JURS CO.
8th and Carleton Streets, Berkeley, California

a subsidiary of General Precision Equipment Corporation

NEW YORK	TULSA	LOS ANGELES	HOUSTON	CHICAGO
110 E. 42nd St.	Thompson Bldg.	6399 Wilshire Blvd.	M & M Bldg.	10409 S. Western Ave.

REPRESENTATIVES

SEATTLE: Nebar Supply Company, 3000 Western Ave. **MONTREAL:** Lytle Engineering Specialties, Ltd., 360 Notre Dame St., W. **TORONTO:** Lytle Engineering Specialties, Ltd., 69 Eglinton East. **VANCOUVER:** P. D. McLaren & Son, Ltd., 3277 Main St. **CALGARY:** P. D. McLaren & Son, Ltd., 510 - 9th Ave., W. **MEXICO, D. F.:** Dalma Comercial, S. A. **CARACAS:** Sinclair Spence, C. A., Edificio Galipan. **ENGLAND:** Whessoe, Ltd., Sales: 25 Victoria St., London S. W. 1 Whessoe, Ltd., Works: Darlington, County Durham

4414

WICKWIRE

DOUBLE GRAY

is the wire rope that's...

- extra strong
- field proved
- crush and abrasion resistant

Compare Wickwire Double Gray IWRC Wire Rope with the improved plow steel IWRC ropes you're probably using now. You'll see that Double Gray has a rated breaking strength that's 15% greater than the catalog breaking strength of these ropes. And it resists crushing and abrasion better, too. That's because Double Gray is made of *extra* improved plow steel — a new type of rope steel that's being widely praised for its superior strength and toughness.

Yet Wickwire Double Gray Wire Rope gives you even more! Because its makers have long been known for the care with which they make and test their ropes, you know you're getting a safe rope. Like all other Wickwire Ropes, *Double Gray was thoroughly tested both in the laboratory and the field before it was offered to the trade!*

Get the complete story today on how you can best use the extra strength and toughness of Wickwire Double Gray Wire Rope in your operations.

5088

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

WICKWIRE ROPE
A CF&I PRODUCT

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver
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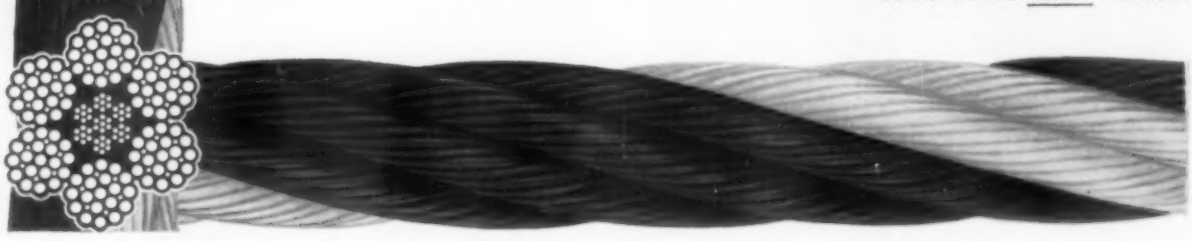
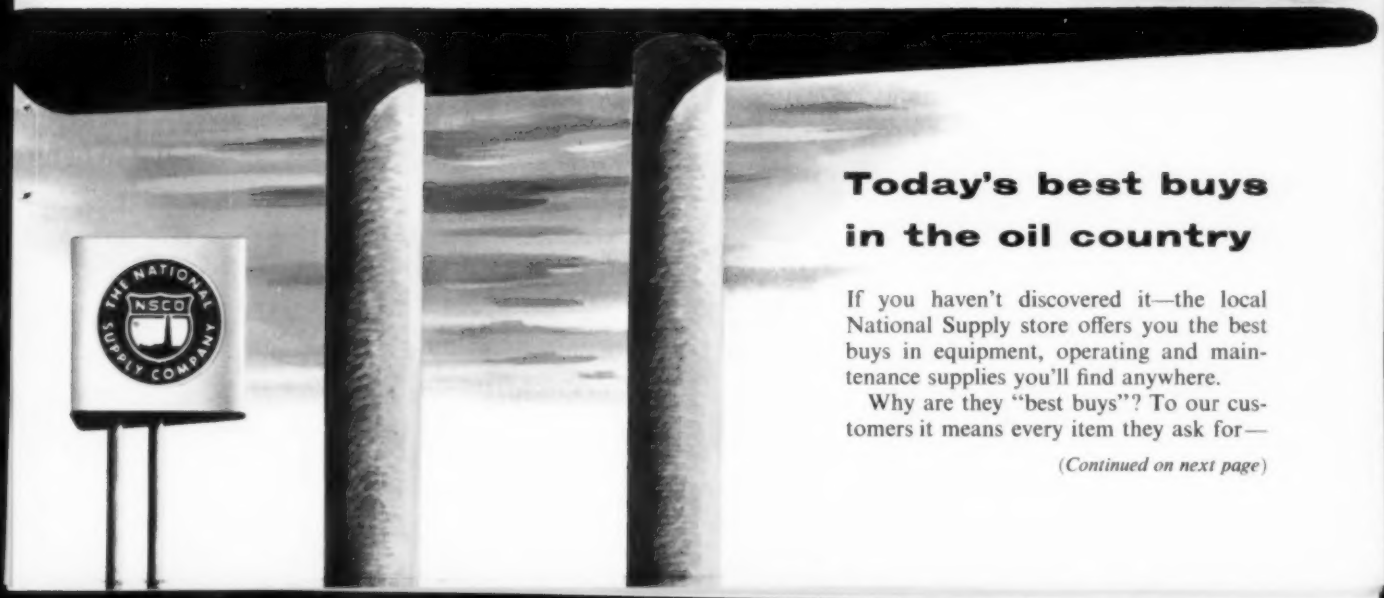
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.)
New Orleans • New York • Philadelphia

LOOK FOR THE YELLOW TRIANGLE





Today's best buys in the oil country

If you haven't discovered it—the local National Supply store offers you the best buys in equipment, operating and maintenance supplies you'll find anywhere.

Why are they "best buys"? To our customers it means every item they ask for—

(Continued on next page)

be it swages, fittings, pump parts, bearings, wire line—is of the best and highest quality obtainable.

And, because National store men make it their business to anticipate the needs of operators in their areas, stock items are available to fill those needs. If a special item, not normally stocked, is needed—it is ordered in the fastest way possible.

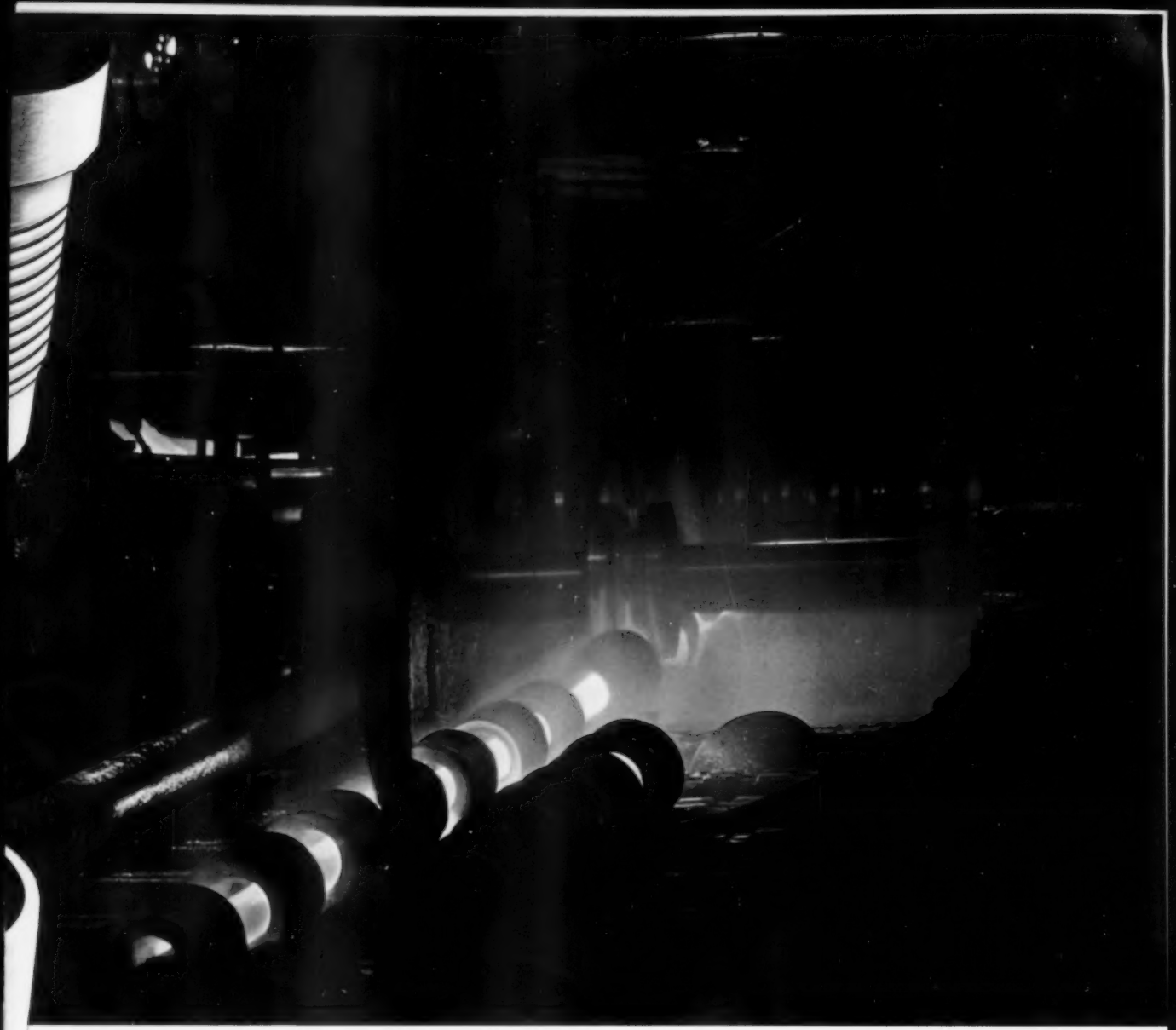
Tailoring equipment and supply inventory to your specific needs any day of the week is not an easy task. Hundreds of National field personnel and 128 stores work at the job around the clock. Moving your rig into a new territory? You'll find maintenance items quickly available at the nearest National Store. Thinking of a water-flood plant? Replacing pumpers? Need new wellhead assemblies? Equipment, supplies and operating information are as near as your local National store.

The best buy of all to many of our customers is the brand of service that comes with every purchase. Prompt handling, concern for performance and extraordinary assistance in emergencies is standard policy in National Supply store operations.

Add them all up—top quality products, in sizes and types that you specifically need, operating information, and extraordinary service. To most oilmen, this means "best buys." Why not visit your National Supply store soon and see for yourself?

Modern National Store interiors are designed to give you convenient "picture window" views of equipment, parts and accessories.

You can minimize the costly dangers of internal corrosion and paraffin accumulation by using Spang plastic coating—the only plastic coating in the industry applied at the mill. Order your next string of Spang Tubing plastic coated.



Rigid mill control standards insure SPANG tubing quality

From the rolling of billets (see above) through each successive manufacturing step, Spang Tubing is completely quality-controlled by a series of accurate tests and inspections. The results are these outstanding features of two fine Spang Tubing products:

Spang Extreme Line Tubing

• Provides maximum running speed; fast joint make-up • Has 100% joint strength • Provides 100% resistance to leakage • Has 50% less connections • Provides positive shoulder contact engagement • Has a streamlined exterior • Is available in grades J-55, N-80 and P-105 to suit every well condition.

Spangseal Tubing

• Has 50% less connections • Provides 100% resistance to leakage • Provides more hole clearance • Eliminates "hanging-up" while running • Available in grades J-55, N-80, and P-105 for every well condition.

Gain the operating profit benefits of using tubing that will give you greatest performance. Order quality Spang Tubing from National Supply today.

SPANG-CHALFANT DIVISION

MAIN OFFICE: Two Gateway Center, Pittsburgh 22, Penna.
DIVISION TUBULAR OFFICES: Denver, Colorado; Houston, Texas; Fort Worth, Texas; Los Angeles, California; New York, N.Y.; Toledo, Ohio; Tulsa, Oklahoma; Calgary, Alberta, Canada
NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE AND ELECTRICAL CONDUIT

THE NATIONAL NSCO SUPPLY COMPANY

On the next page, another quality Spang product...

SPANG® CW

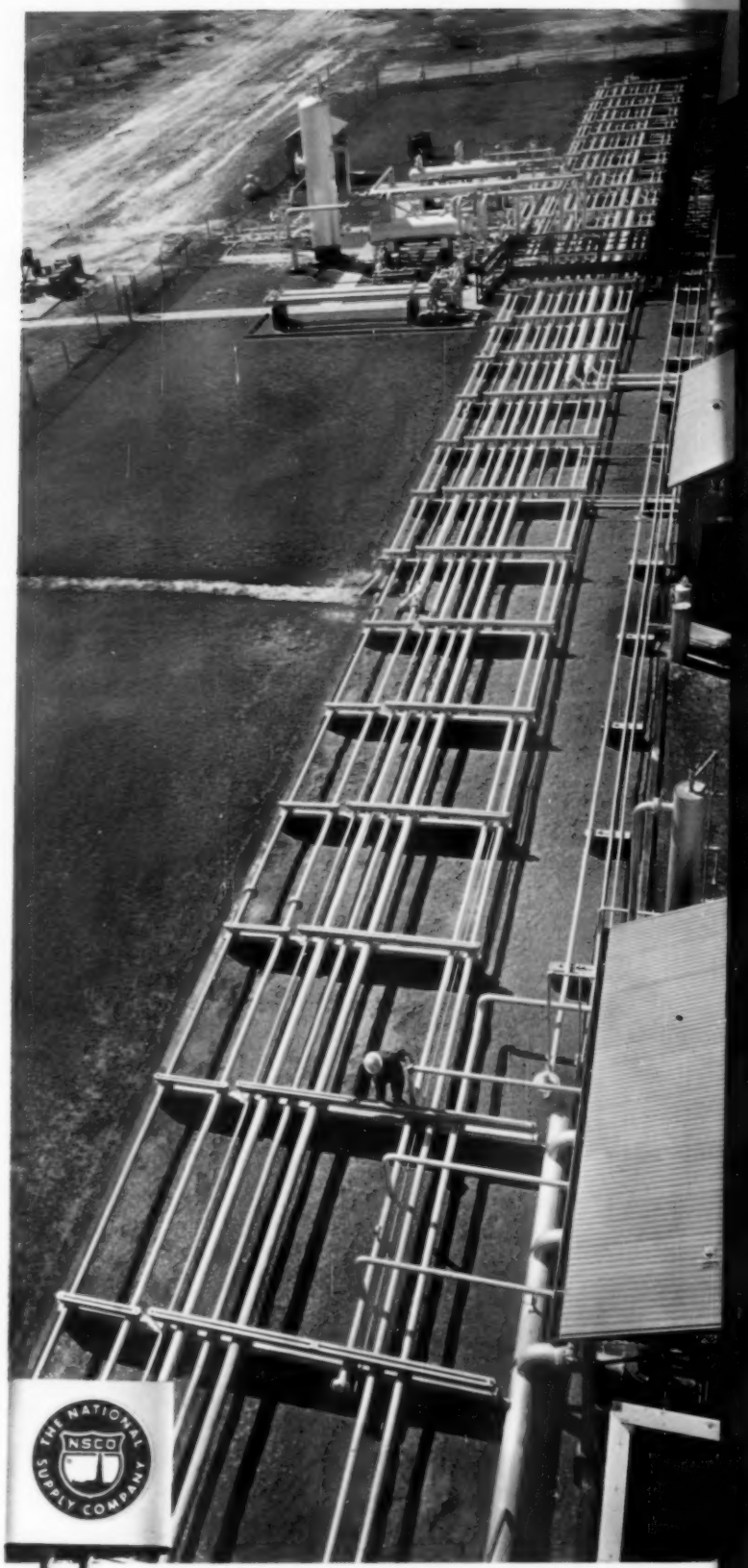
Steel Pipe... there's no extra cost for its special quality

Careful manufacturing control is the reason why Spang CW is your best buy for every type of piping installation.

Rigid tests and inspections during manufacturing and before shipping insure long service life of Spang CW Pipe. Every length is hydrostatically tested and inspected for thread quality and uniformity.

Such quality control features pay off wherever you use Spang CW Pipe—and, most important, you pay no more for this top-product assurance.

All sizes of Spang CW—plain end, or threaded and coupled—are readily available at your nearest National Store. Order now for your next job!



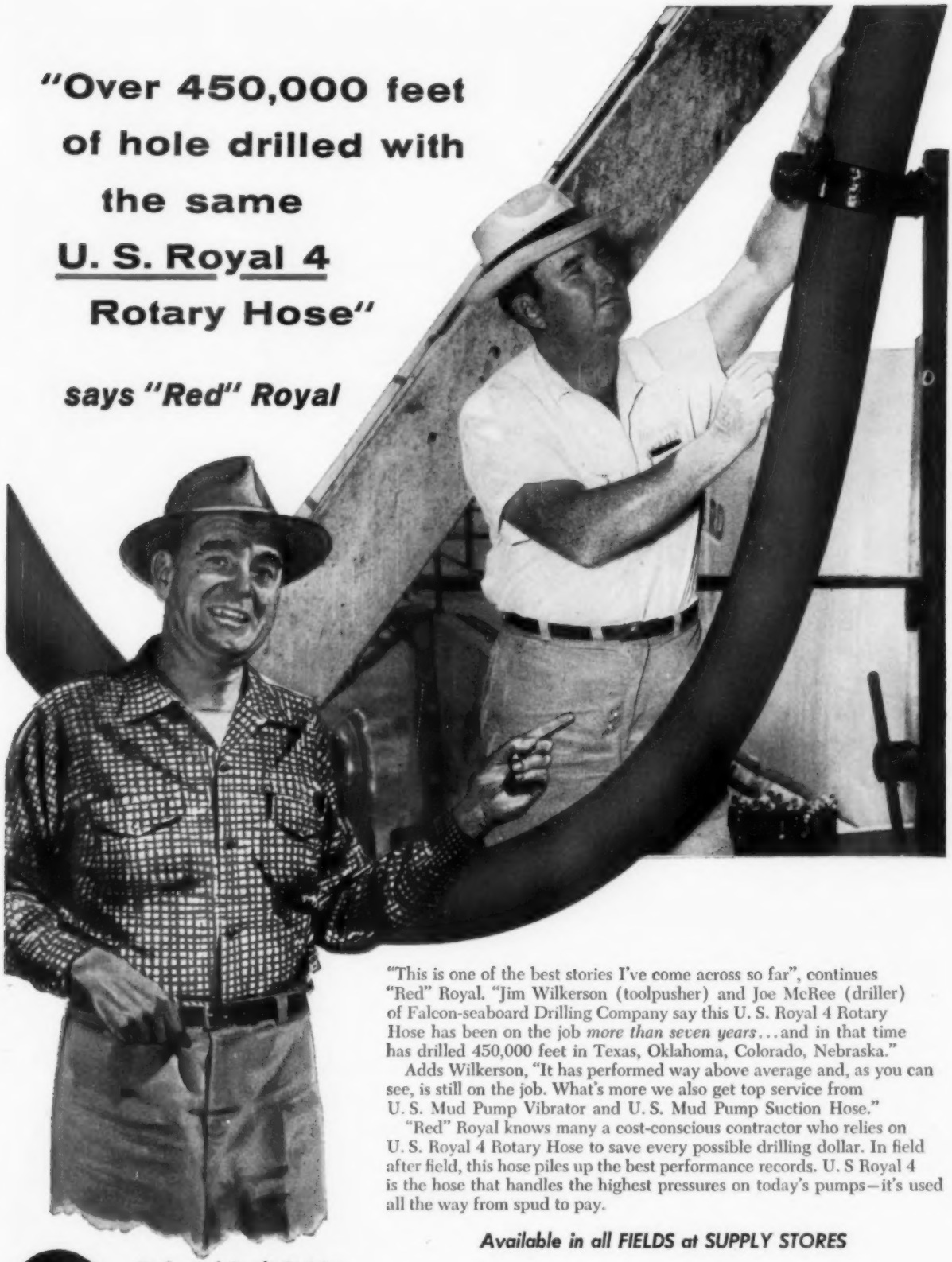
GATHERING LINE SERVICE is one of the many oil field applications for dependable Spang CW Pipe. In addition to gas, oil and water lines, you can use it for roof rails, step rails and other structural purposes.

SPANG-CHALFANT DIVISION

MAIN OFFICE: Two Gateway Center, Pittsburgh 22, Penna.
DIVISION TUBULAR OFFICES: Denver, Colorado; Houston, Texas; Fort Worth, Texas; Los Angeles, California; New York, N.Y.; Toledo, Ohio; Tulsa, Oklahoma; Calgary, Alberta, Canada
NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE AND ELECTRICAL CONDUIT

"Over 450,000 feet of hole drilled with the same U. S. Royal 4 Rotary Hose"

says "Red" Royal



"This is one of the best stories I've come across so far", continues "Red" Royal. "Jim Wilkerson (toolpusher) and Joe McRee (driller) of Falcon-seaboard Drilling Company say this U. S. Royal 4 Rotary Hose has been on the job *more than seven years*...and in that time has drilled 450,000 feet in Texas, Oklahoma, Colorado, Nebraska."

Adds Wilkerson, "It has performed way above average and, as you can see, is still on the job. What's more we also get top service from U. S. Mud Pump Vibrator and U. S. Mud Pump Suction Hose."

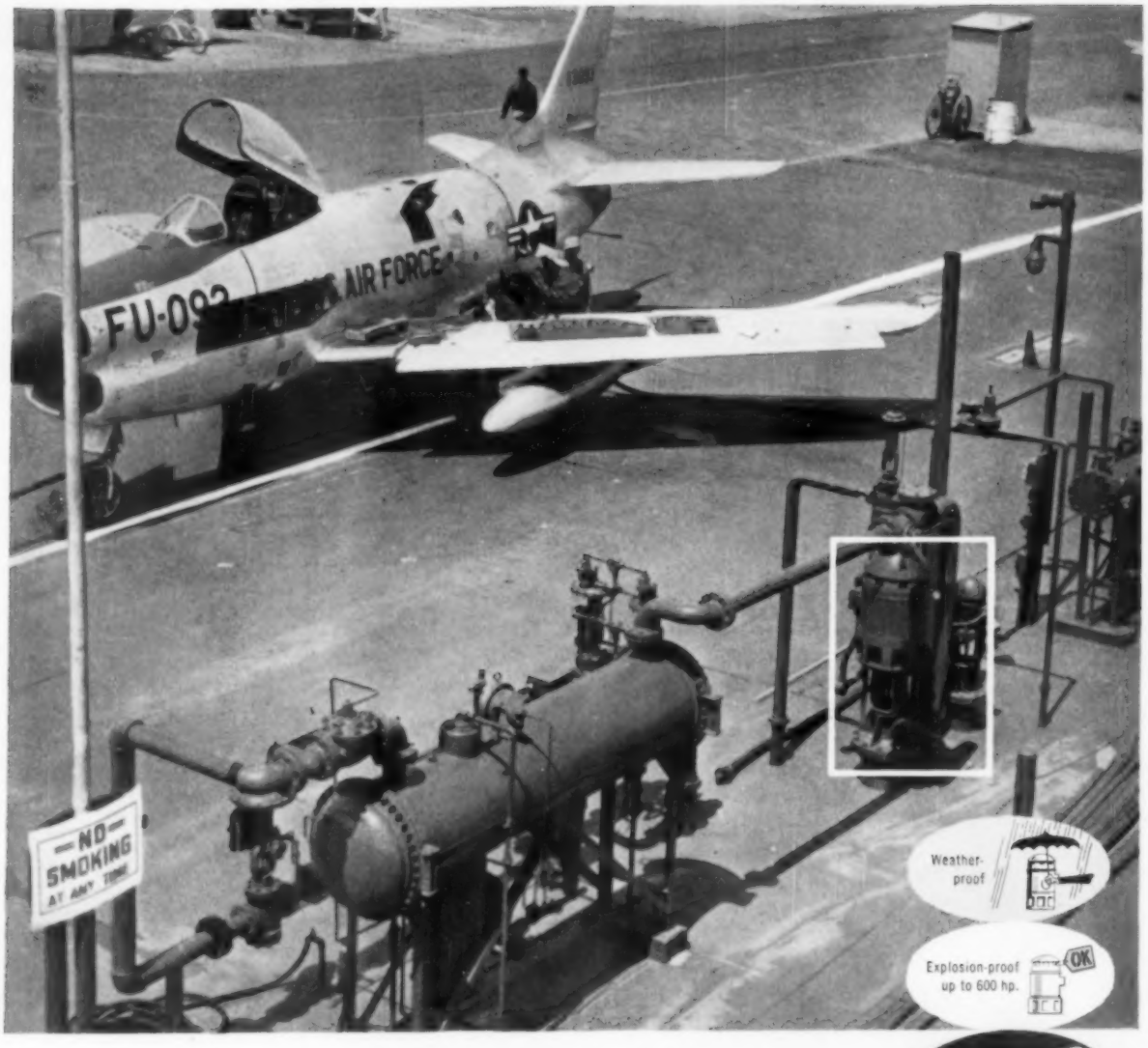
"Red" Royal knows many a cost-conscious contractor who relies on U. S. Royal 4 Rotary Hose to save every possible drilling dollar. In field after field, this hose piles up the best performance records. U. S Royal 4 is the hose that handles the highest pressures on today's pumps—it's used all the way from spud to pay.

Available in all FIELDS at SUPPLY STORES

US RUBBER

Mechanical Goods Division

United States Rubber



This job needs a ready motor!

Louis Allis vertical motors dependably handle vital jet refueling in rugged outdoor service

Air Force defense installations demand equipment that's ready today, tomorrow, and always. There's no time for mistakes. That's why Louis Allis motors are counted on for dependability. Illustrated above are two typical examples of service where instant action is vital.

The installation is an Air Force jet refueling site. The motors shown are Louis Allis vertical solid-shaft explosion-proof units designed for petroleum-pumping service. The smaller ribbed unit is a non-ventilated 1 hp. motor used to pump fuel to the plane; the larger unit is a 30 hp. fan-cooled transfer-pump motor.

Both of these motors are weatherproof; they assure dependable service and long life under baking sun and in driving rain- or dust-storms. Louis Allis insulating varnish is sure protection against moisture or embrittlement, and sturdily resists even the effects of acids or alkalis in the extreme environmental conditions encountered in petrochemical service.

Locked bearings assure long bearing life, and a readily accessible thrust bearing makes infrequent maintenance quick and easy.

Get this dependability in *your* petroleum applications. Contact your Louis Allis District Office, or write The Louis Allis Co., 449 E. Stewart St., Milwaukee 1, Wis.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

CRUSHPROOF...LEAKPROOF...FLEXIBLE FOR HANDLING VOLATILES...GASES

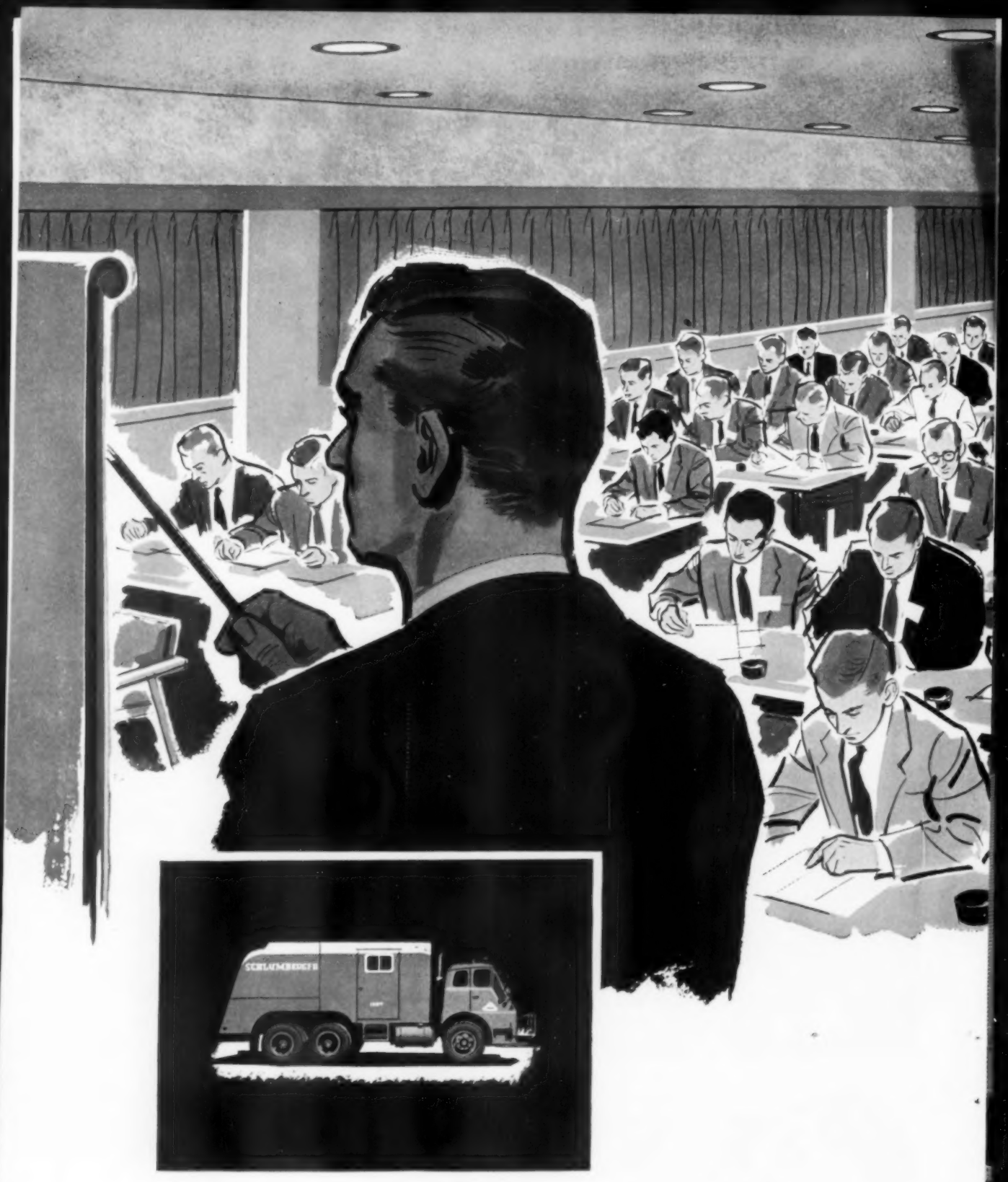
PRESSURES TO 200 PSI . . . SWIVEL FLANGE FOR EASY INSTALLATION

Stainless steel lined metal hose for rugged flexibility . . . covered with tough rubber for absolute leakproof security . . . that's Penflex Suction and Discharge Hose. It's lighter in weight than any other comparable competitive hose . . . easy to handle with swivel flange that allows installation in any position without turning entire hose to meet bolt holes. End fittings are made of steel to meet specifications of refinery engineers.

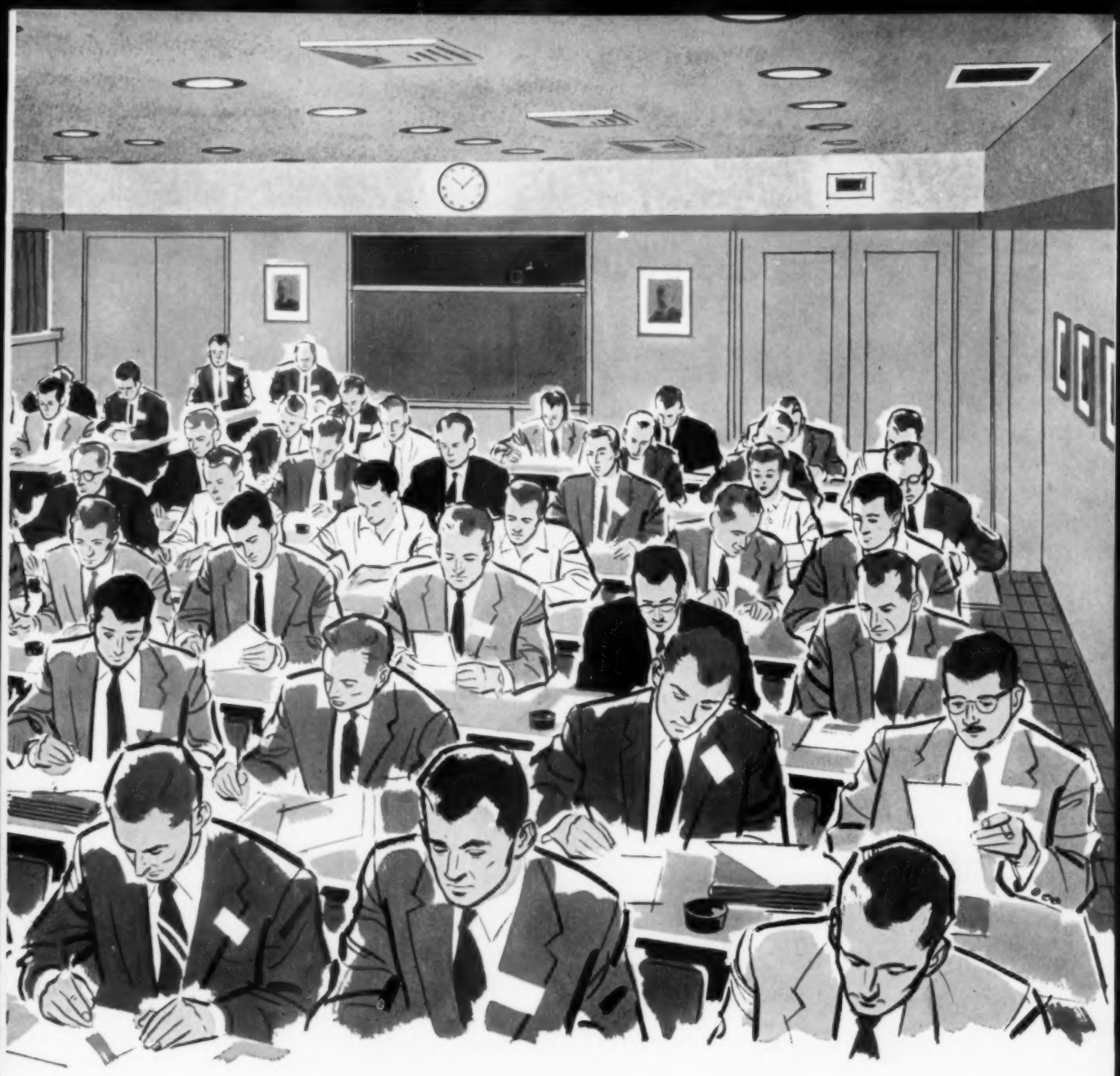
Penflex Suction and Discharge Hose has been thoroughly tested and is used by leading industries throughout the nation for all-purpose duty. It is proved and approved the all-purpose hose for oil, gasoline, solvents, corrosive chemicals and other volatiles and liquids. Available in sizes 2″ to 12″ I.D. in galvanized steel, stainless steel and bronze pressure carrier. Write for complete details.

PENNSYLVANIA FLEXIBLE METALLIC TUBING COMPANY
7213 POWERS LANE, PHILADELPHIA 42, PA.
Branch Sales Offices: Boston New York Chicago Houston Cleveland Los Angeles
and Distributors in Principal Cities

FLEXIBLE TUBING, AUTOMATIC BARREL FILLERS, PNEUMATIC RIVET PASSERS, ACCESSORIES AND FITTINGS



"The more extensive a man's knowledge of what has been done, the greater will be his power of knowing what to do."—Disraeli



We Want To Tell You All We Know About Log Interpretation

Each year Schlumberger logging conferences are held throughout the country — conferences that were established by Schlumberger, as a service to the oil industry.

The experience of more than a million operations and the knowledge gained by thirty years of continuous research, are given freely to the men attending these conferences. Logical and understandable methods of analysis and interpretation are used to strip away the mysteries surrounding logging and its modern complementary services.

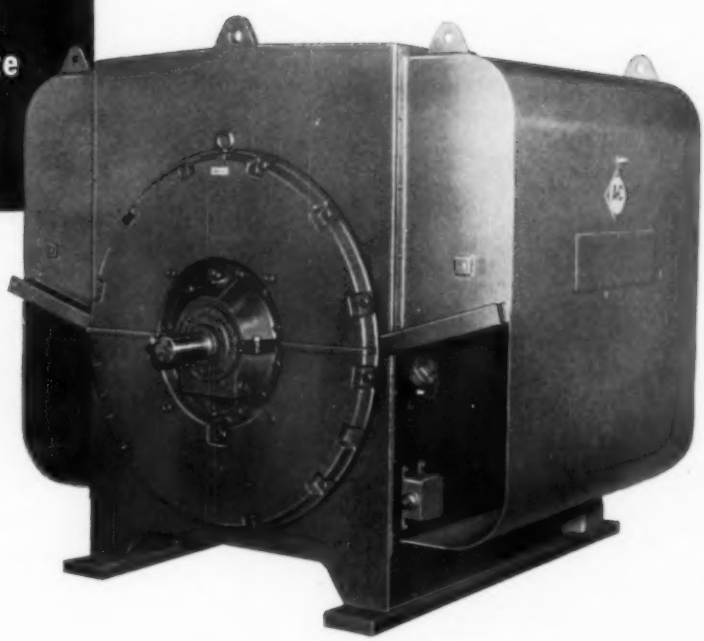
More than 9,000 oil men — engineers, geologists, geophysicists, owners and operators have attended these conferences — a chair is waiting for you!

Contact your local Schlumberger office for further information.

SCHLUMBERGER . . . Engineering for Better Service

Eliminate costly enclosures with Allis-Chalmers weather-protected MOTORS

Modern features
cut operating, maintenance expense . . . give MORE dependability



Here's a newly designed line of Allis-Chalmers weather-protected motors with the ability to "take" outdoor conditions. This means no expensive protective enclosures are needed . . . a big saving in plant or installation building costs.

Designed to meet defined NEMA requirements, these motors incorporate many important features which assure dependable outdoor operation:

- **Ventilating System** — Low velocity intake, vertical lift, change of direction and high velocity discharge of ventilating air keep rain, snow, sleet, dust and dirt out of vital parts.
- **Removable Air Ducts** — To facilitate inspection and maintenance of interior air passages, air intake ducts are designed for quick removal.
- **Stator Assembly** — Removable as a unit, it simplifies maintenance and minimizes downtime.
- **Split Sleeve Bearings** — Capsulized design permits access to motor interior without disturbing the bearings or their enclosures. Positive vapor seal is used on high-speed motors. Antifriction bearings are available for slow speed motors.
- **Proven Insulation** — Famous Allis-Chalmers insulation systems (Class A and B) are available. And, for extreme temperatures, or where high resistancé to abrasion and moisture is required, Allis-Chalmers can provide the revolutionary *Silco-Flex* system.

Silco-Flex is an Allis-Chalmers trademark.

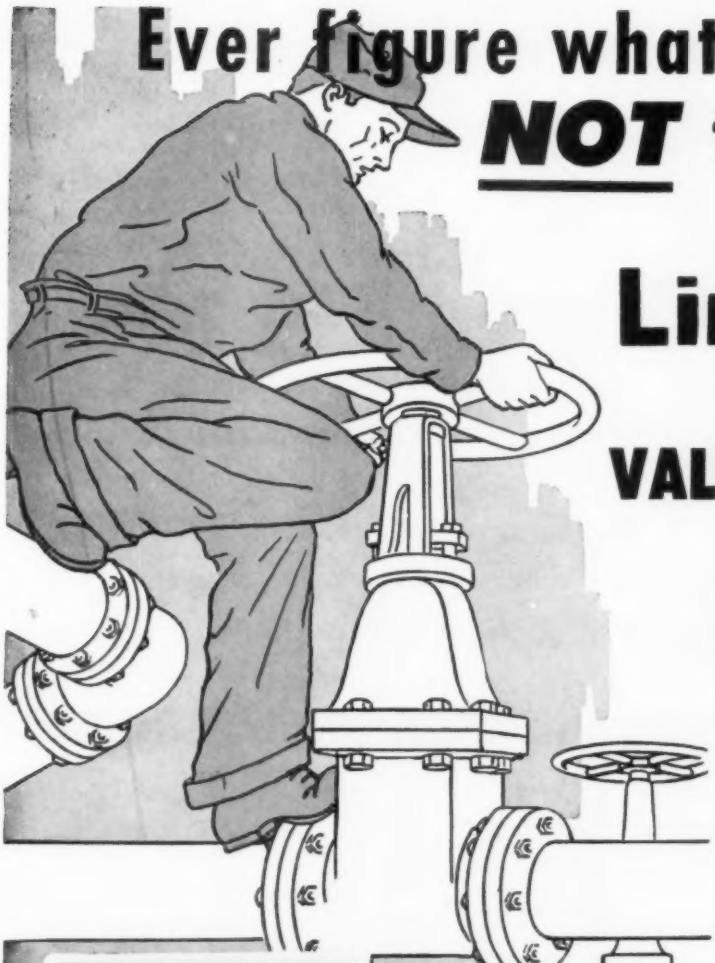
THIS DESIGN available in ratings from 250 to 900 hp. Other designs in larger horsepower ratings are also available. Contact your A-C sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin. Ask for Bulletins 51B8606A and 05B7894.

A-5292

ALLIS-CHALMERS

Ever figure what it costs **NOT** to use

LimiTorque® *Automatic* VALVE OPERATION?



How much does opening and closing Valves *by hand* cost you—in man-hours—in physical danger to workmen who must climb to high or dangerous locations?

How much time, labor, and money could be saved in your plant by opening and closing valves *automatically*—at correct operating speeds—by the mere "push of a button"? With LimiTorque, one finger does the work of many hands. LimiTorque control permits one man to operate, and know the exact position of each valve from a central, conveniently located control panel.

LimiTorque protects valve seats, discs and stems from damage, by automatically shutting-off power source, should an obstruction interfere with valve closing. Valves operated by LimiTorque are always seated tightly, because the seating thrust of valve disc is accurately maintained in each closing-cycle, due to the patented torque limiting mechanism.

LimiTorque is, by far, the most widely used valve operator in the World . . . Send for complete new Catalog L-550, on your Business Letterhead.

LimiTorque® *PHILADELPHIA GEAR WORKS, INC.*

ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices in all Principal Cities

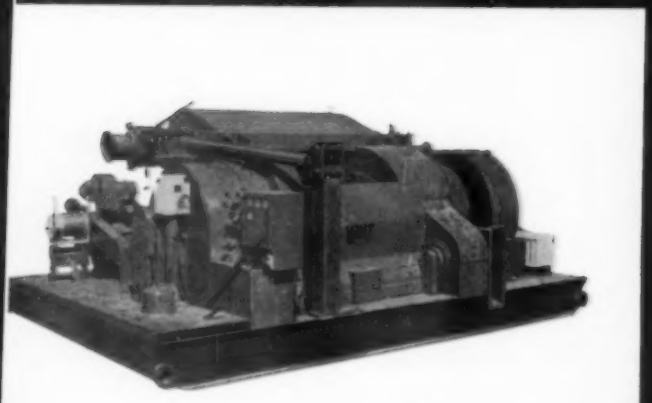
INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

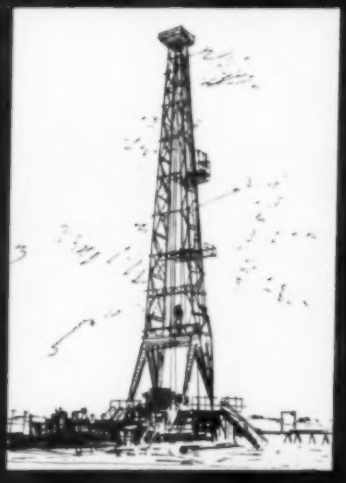
Limitorque Corporation • Philadelphia

the U-1220-EB *electra-flow* draw works

for greatest economy and smoothest performance...anywhere!

featuring 2 1/2" pitch triple extra heavy drum drive chain and single or split package





UNIT RIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

UNIT RIG & EQUIPMENT CO.

Export Sales: MID-CONTINENT SUPPLY CO.
45 Rockefeller Plaza, New York 20, N. Y.
Cable: MIDUNITRIG
Box 1889, Tulsa, Okla.

Unit Rig's Electra-Flow draw works — model U-1220-EB — in a single or split package — now offers the operator the widest application of the operating advantages of electric power for land or offshore drilling. Electric motors with rated horsepower of 1200 to 2000 are mounted as an integral part of the compact design. Dual input drive, coupled with high and low drum drives, provide four hoisting speeds. These speeds, coupled with the wide range of power and control of D.C. electric motors, give ideal performance characteristics. Two forward and two reverse speeds are available to the rotary, catshaft and optional sand line drum.

For maximum flexibility, greater operating economy, and trouble-free performance, ask your nearest Unit Rig representative about the U-1220-EB Electra-Flow draw works. Or write Unit Rig in Tulsa for new catalog.

They Say—

"How to" phase diagram

Dear Sir:

Please compliment Professor Paul Buthod on his very fine article, "Pressure Drop in Heaters," appearing in The Oil and Gas Journal, July 1, 1957, pp. 111-118. His articles are always top-notch.

Now then, I would like to suggest that for benefit of readers like me, please get him to write an article showing how to get:

1. The boiling points and other data of his Fig. 1, "Evaluation Curves," from A.S.T.M. distillations plus usual routine laboratory methods in a control lab.
2. The data used in his Fig. 2, "The Phase Diagram."
3. Then, give us the step-by-step information to construct the phase diagram.
4. Then, present an example using it, the phase diagram.

You may think this is very elementary, but many of us in refining and process-engineering work have not had the advantage of learning how to make the phase diagram, and how to use it, because Edminster only published it in 1948.

Professor Buthod writes such practical articles that I am sure he can do an excellent job in writing this "how to do it" article on the phase diagram. Hope it comes out soon in print. These are the kind of articles in The Oil and Gas Journal that help us in the refineries to keep up to date. Keep up the good work.

K. S. Ritchie
Bakersfield, Calif.

(Editor's note: We have commissioned Professor Paul Buthod, head of the chemical engineering department at the University of Tulsa, to write a followup article which will include the points suggested by Reader Ritchie.)

Don't scratch Australia!

Dear Sir:

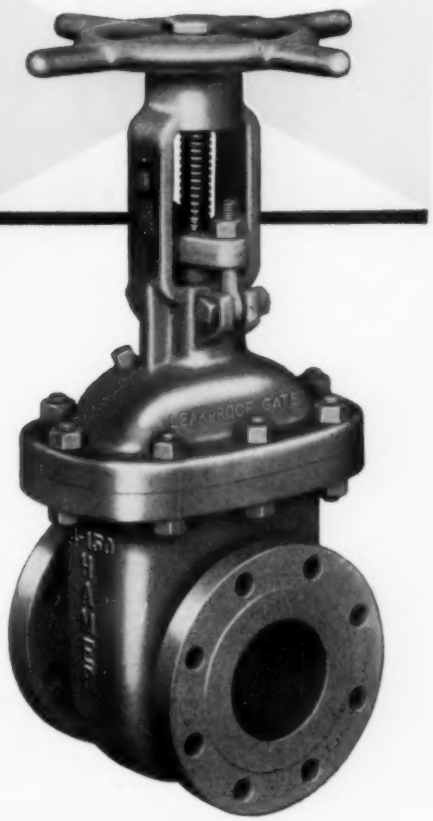
West Australian Petroleum, Ltd., has announced . . . that their Rough Range No. 10 well met the Birdrong sandstone at 3,659 ft. A core showed evidence of oil and gas. Drill-stem test is being made before drilling ahead.

The well is 700 ft. northeast of the No. 1 discovery well where the Birdrong produced heavy oil from 3,600 ft. in December 1953.

The importance of No. 10 well show-

Introducing the new

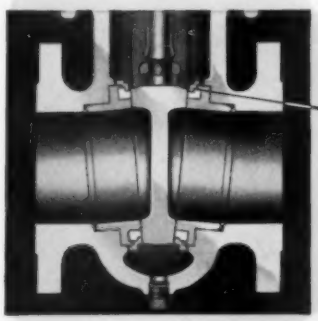
HAMER
Leakproof
GATE
VALVE



Impenetrable Shut-off Upstream —Downstream

This new Hamer Gate Valve incorporates a double sealing action design that's both absolute and foolproof. In addition to the precision metal to metal fit of the wedge, the Hamer Gate Valve incorporates two Teflon® seal rings which compress dead tight against the wedge. Thoroughly proven under the most rugged field condition tests, the Hamer Gate Valve with its positive shut-off both upstream and downstream, eliminates the need for a double block and bleed in piping installations.

Hamer Gate Valves incorporate a new high standard of valve production. Stainless steel valve seats are welded-in for accurate fit. Locking rings are of corrosion resistant stainless steel. And precision finish on critical parts assure a smooth operating valve even after years of hard service. Write today for literature. See for yourself why Hamer Gate Valves are truly a valve without equal.



Double Sealing Action forms Impassable Shut-off

TEFLON SEAL RINGS... Renown for their inert characteristics, these Teflon seal rings have amazing durability even under the most adverse of service conditions.

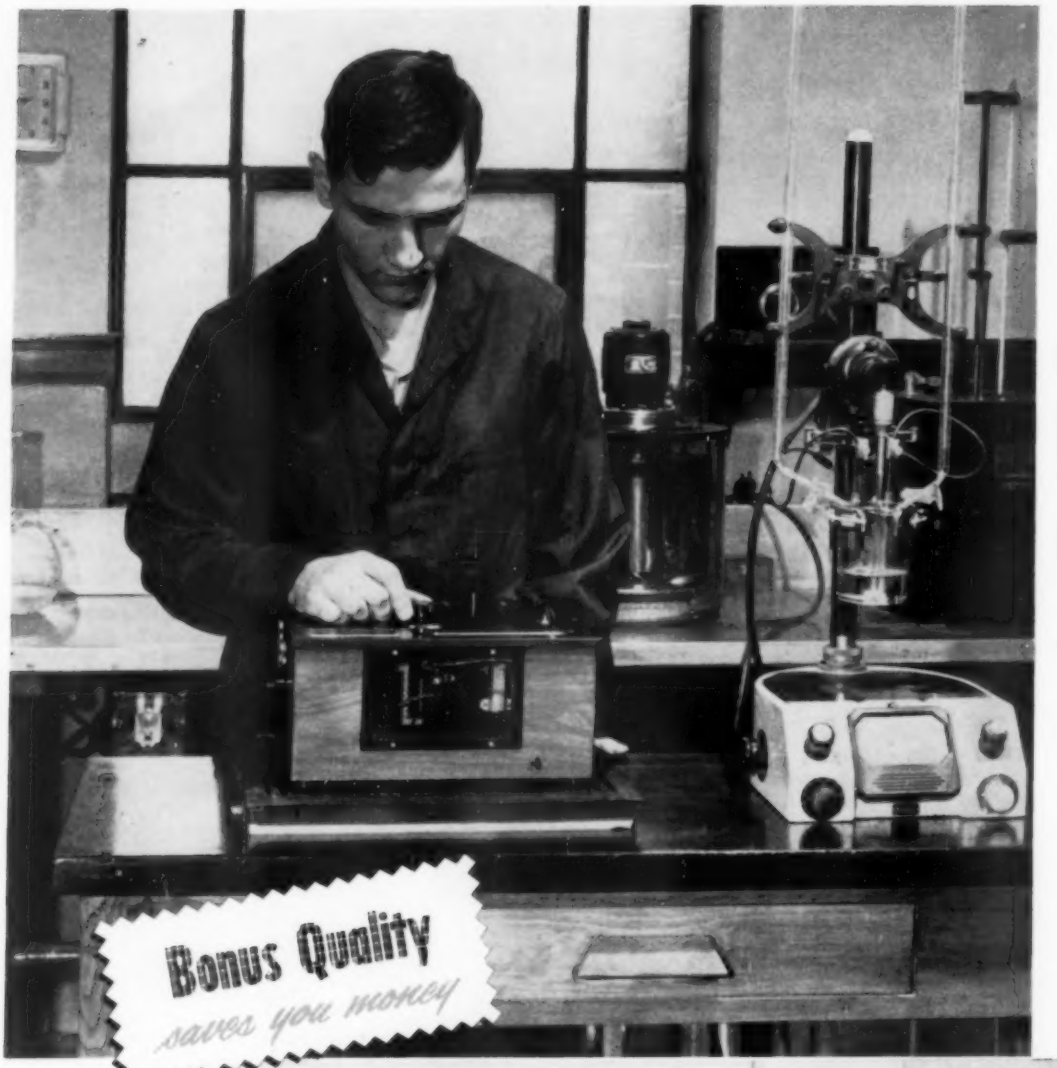
PRECISION FINISHED GUIDES... Wedge guides are machined to exacting tolerances. Eliminates chatter and wear caused by line pulsations, accurately centralizes the wedge between the seats.

®RTM DuPONT

Send for Gate Valve Catalog ▶

Hamer *VALVES INC.*
P. O. Box 1851
2919 Gardenia Ave., Long Beach 1, Calif.
Representatives throughout the World

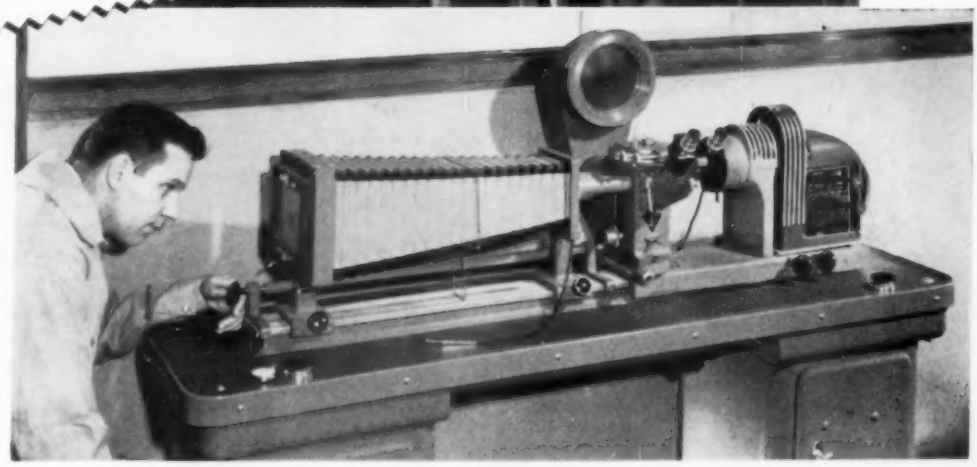
How Bucyrus-Erie *Quality Control*



Bonus Quality *saves you money*

For chemical analysis of steel and other materials, Bucyrus-Erie's laboratory has the finest scientific equipment, including the spectrophotometer shown here. This apparatus analyzes the elements in steel by measuring the degree to which a steel solution absorbs certain waves of light.

The texture and physical makeup of all metals used in Bucyrus-Erie equipment are important factors in their strength and durability. Here a metallographic microscope is being used to check the structure of a sample of metal and to photograph it for permanent records.



FIRST with the *FINEST* in *SPUDDERS*

Helps You *Earn More Dollars*

Each lot of steel used in building Bucyrus-Erie spudders undergoes exacting metallurgical tests to insure that Bucyrus-Erie's rigid specifications have been met and, where conditions warrant it, photomicrographs are made to permit close study of grain structures. After steels have been subjected to various heat-treating processes, they are selectively tested for tensile strength, yield point, compression resistance, hardness, and ductility. A quench-testing machine assists in determining the hardenability of various steels. Only after they meet all specifications are the steels allowed to be used in Bucyrus-Erie drills.

Such close attention to quality pays off for you on your well jobs through efficient operation . . . long drill life . . . outstanding performance. That explains why there are more Bucyrus-Erie spudders in use today than any other make.

Select the Bucyrus-Erie drill best suited to your needs. For more information on the Bucyrus-Erie of your choice, see your local distributor or write direct. 44557

BUCYRUS-ERIE COMPANY

South Milwaukee • Wisconsin

Workover job in Kentucky

60-L Top-to-bottom drilling to 1,500 feet; servicing to 2,000 feet; 2,750-lb. tool capacity.

Top-to-bottom work in Alberta, Canada

48-L (with 70' 4" Tripod Derrick) Top-to-bottom drilling to 6,000 feet; servicing to 7,000 feet; 6,700-lb. tool capacity (with standard 61' derrick); 300,000-lb. static load capacity with Tripod Derrick.

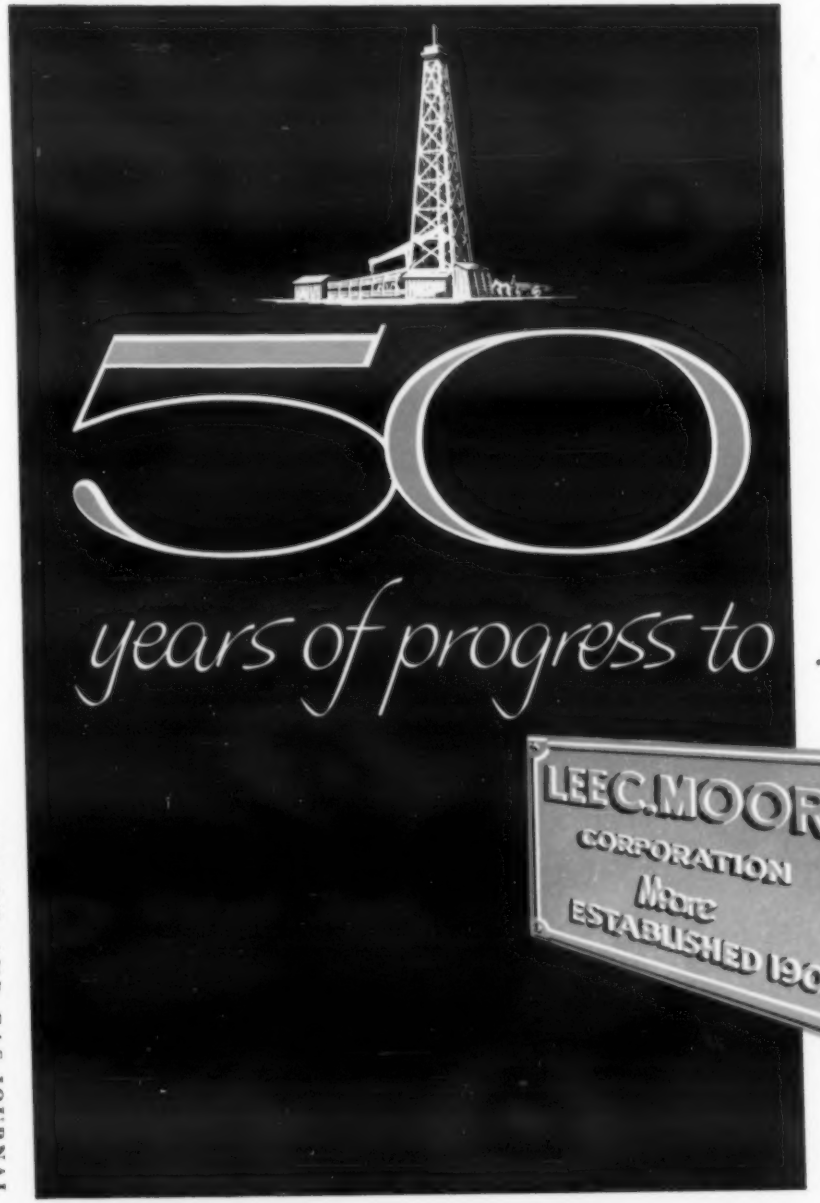
Servicing well in Kansas

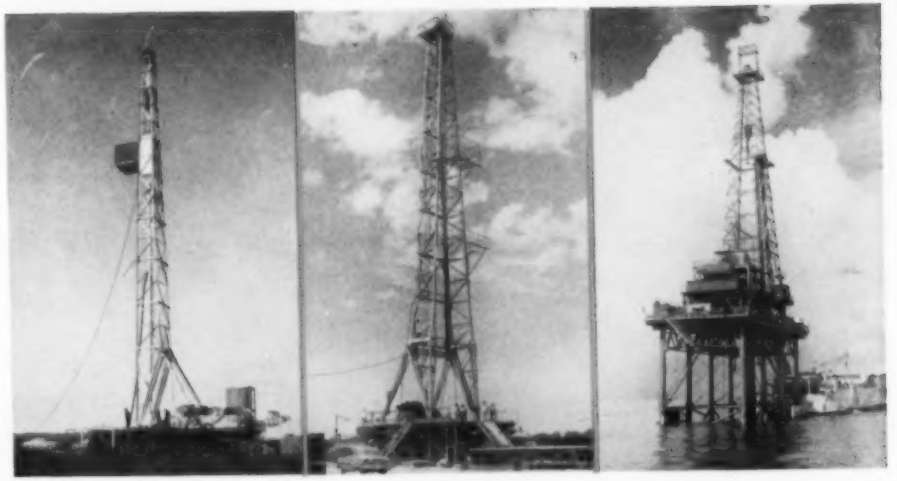
36-L (with tandem mounting) Top-to-bottom drilling to 3,500 feet; servicing to 4,000 feet; 5,000-lb. tool capacity.

Top-to-bottom work in Oklahoma

28-L Top-to-bottom drilling to 2,500 feet; servicing to 3,000 feet; 3,700-lb. tool capacity.

BUCYRUS ERIE





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ing is that reservoir fluids are apparently not depleted, though structurally lower than No. 1, and suggest the reservoir was exposed at some stage and sealed itself off. The oil, therefore, has not migrated as suggested by the composition of the discovery oil.

I would be glad if you could find space for the above information to restore interest in Australian oil search.

Results of tests will be forwarded when available.

W. D. Mott
Consulting Geologist
Brisbane, Australia.

Wasted Drilling Time

Dear Sir:

I wish to compliment you on your tactful revision of our paper, "Rig Performance in the North Louisiana Area," ("Seven Steps to Faster Drilling," July 1, p. 129). I must admit it is by far a better job of presentation than we were able to produce in Shreveport in the early part of the year.

About the only comment I have regarding what we might have done to improve this paper was to place greater emphasis on contractor-operator relations.

We feel that there is more nonproductive time consumed because of this lack of understanding than for any other reason while drilling operations are in progress. This lack of understanding and cooperation is both the fault of the contractor as well as the operator in many cases.

Robert W. True
Drilling Engineer
Big Chief Drilling Co.
Oklahoma City.

Venezuelans have it best

Dear Sir:

The heading of your article on pages 66-67 of The Oil and Gas Journal, June 3, 1957, was quite disturbing—"Motorists in the U. S. Get the Most for Their Money in Gasoline." The figures given clearly shows that both Mexico and Venezuela get more for their gasoline dollar.

Mexico with super 90 at 27.2 cents per gallon versus U. S., 89.5 regular in the gulf area at 30.1 cents per gallon.

Venezuela gets the real bargain: Super 96 at only 25.7 cents per gallon.

Forest Leighty
Aruba, Netherlands Antilles.

Journal in geology class

Dear Sir:

Last fall my class in petroleum geology had 36 in it. I'm not expecting any more this fall, so you can put me

It's easy to...

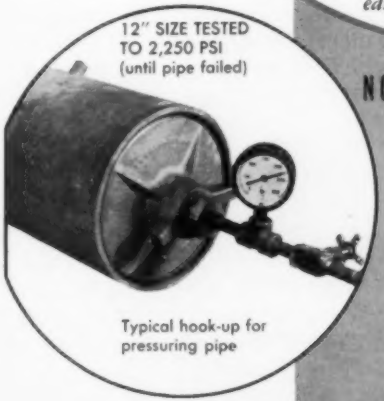
- Test Piping & Vessels
- Add Fittings
- Propel Pigs by Compressed Air

with the . . .

IMPROVED WmSON WEDGE-LOCK PIPE PLUG

Sizes: 3" to 14"

PLUGS PIPE ENDS TEMPORARILY
easily installed & removed



NOTE THESE IMPROVEMENTS:

- ★ Each size seals in greater range of pipe ID's
- ★ Independent anchor segments insure uniform grip inside pipe
- ★ Large bypass hole through center
- ★ Rugged sealing element
- ★ Permanent dry film lubrication

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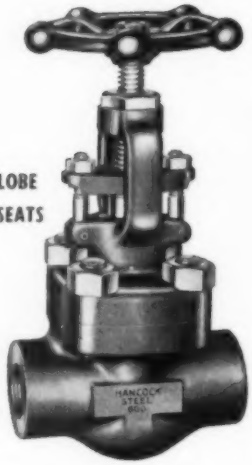
NEW 600# STEEL

NEW

TYPE 5500 — 600# GLOBE
INTEGRAL HARD-FACED SEATS
"500 Brinell"
Stainless Steel Discs.



Especially suitable for high pressure steam and temperature services in power plants. **Sizes:** ¼" thru 2". **Standard Materials:** Forged carbon steel A.S.T.M. A-105 Gr. II. **Alternate Body and Bonnet Materials:** 1¼% Chrome, ½% Moly Steel, A.S.T.M. A-182 Gr. F-11. **Connections:** Screwed and Socket Weld Ends. For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F.

NEW

TYPE 5520 — 600# GLOBE
TYPE 5530 — 600# ANGLE
RENEWABLE "300 BRINELL" STAINLESS STEEL SEATS
"500 Brinell" Stainless Steel Plug Discs.

Ideal for processing plants and general industrial service. **Sizes:** ¼" thru 2". **Standard Materials:** Forged carbon steel A.S.T.M. A-105 Gr. II. **Alternate Trims:** 18-8 Type 316 Stainless Steel; Monel. **Alternate Body and Bonnet Materials:** 5% Chrome, ½% Moly Steel, A.S.T.M. A-182 Gr. F-5; 18-8 Type 304 Stainless Steel A.S.T.M. A-182 Gr. F-304. **Connections:** Screwed, Socket Weld and Flanged Ends. **Screwed and Socket Weld Valves:** For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. **Flanged Valves:** For all pressures up to 600 psi at 850°F. O.W.G. — 1440 psi at 100°F.

These 600# bolted bonnet forged steel valves really make sense to every man who knows the economy of quality valves. Designed into them are plus values that substantially reduce profit-draining production shut-downs, maintenance problems and inventory costs. Built as companions to the widely-used Type 950 Hancock 800# Steel Gate Valves, they offer:

Thick, Rigid Body and Bonnet Flanges that can withstand more than ten times the rated pressure of the valve. The flanges butt — no bending, no distortion.

Re-usable Flexitallic Bonnet Gasket, in combination with the rigid body and bonnet flanges, prevents bonnet joint leakage. The gasket is a spiral-wound ribbon of stainless steel with asbestos filler and spring-like compressibility. It rests in a groove in the body flange — cannot blow out even if pressures exceed ten times the rating of the valve. *Hancock 600# Steel Valves are the first globe valves to use this important feature.*

Maximum Use of Stainless Steel. Even the stem, swing bolts, nuts, thread bushings and packing gland followers are stainless steel — your assurance of quality that saves throughout the long life of these valves.

The 5500 Line of Hancock 600# Steel Valves is available in Globe, Angle, "Flocontrol," Lift Check and Hi-Pressure Drop designs. Whatever your needs, you can buy these valves with complete confidence in their functional perfection. Like all other Hancock Valves, they are precision engineered and carefully manu-

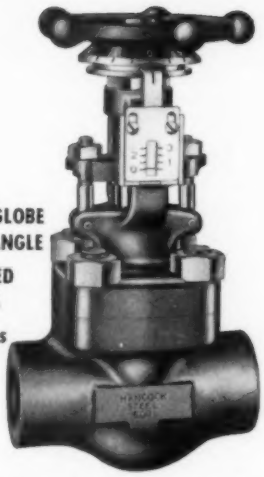
HANCOCK VALVES

PHONE YOUR INDUSTRIAL SUPPLY DISTRIBUTOR. His broad knowledge and experience can be of real value to you. Let him help you select the right Hancock Bronze and Steel Valves for all your service requirements.

HANCOCK VALVES

NEW

"FLOCONTROL"
TYPE 5525 — 600# GLOBE
TYPE 5535 — 600# ANGLE
RENEWABLE HARD-FACED STAINLESS STEEL SEATS
"500 Brinell" Stainless Steel V-Port Discs.



For general industrial service. Variable orifice, shut-off and index combined in a single valve. Any desired setting can be instantly duplicated. **Sizes:** ¼" thru 2". **Standard Materials:** Forged carbon steel. **Connections:** Screwed, Socket Weld and Flanged Ends. **Screwed and Socket Weld Valves:** For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. **Flanged Valves:** For all pressures up to 600 psi at 850°F. O.W.G. — 1440 psi at 100°F.

NEW

HI-PRESSURE DROP
TYPE 5505 — 600# ANGLE
INTEGRAL HARD-FACED SEATS
Stainless Steel Tube.

An orifice type valve, with shut-off and index in a single unit that permits the use of a smaller valve with a large capacity. Designed to withstand the terrific wrecking power of continuous blow-down. Also for use on feed-water, by-pass relief, in turbine washing processes, and where erosion is extremely severe. **Size:** 1". **Standard Materials:** Forged carbon steel. **Connections:** Screwed and Socket Weld Ends. For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. A.S.M.E. maximum boiler pressure 970 psi.

factured. You can be sure of long resistance to wire drawing, galling, steam cutting, erosion and corrosion — for leakproof tightness month after month. They surpass the toughest service demands of process and power piping systems in the most modern refineries, petrochemical, power and industrial plants. A high degree of standardization in all sizes simplifies both maintenance and inventory needs.

Let the durability, performance and economy of Hancock 600# Steel Valves save money for you. Whether you are adding facilities, building a new plant or setting up a revalving program, get all the reasons why these tough valves serve better and longer. Complete information is yours on request.

When Hancocks go in, valve costs go down

NEW

LIFT CHECK VALVE
TYPE 5540 — 600# GLOBE
RENEWABLE HARD-FACED STAINLESS STEEL SEATS
"500 Brinell" Stainless Steel Piston Discs.

For general industrial service. **Sizes:** ¼" thru 2". **Standard Materials:** Forged carbon steel. **Cap:** Bolted. **Connections:** Screwed, Socket Weld and Flanged Ends. **Screwed and Socket Weld Valves:** For all pressures up to 600 psi at 910°F. O.W.G. — 2000 psi at 100°F. **Flanged Valves:** For all pressures up to 600 psi at 850°F. O.W.G. — 1440 psi at 100°F.

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See it and you'll believe it—the

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Texas Stripper Rod Pump

—the pump that won't sand up.

It's especially recommended for shallow, sandy, stripper wells. There are dozens and dozens of these pumps in successful operation throughout the oil patch. Ask your store or the Harbison-Fischer representative in your area to tell you about one running near your lease

"Best Pumps in the Oil Patch"®

down for 40 copies of the Journal correlation chart . . .

This fall we will be using a text for the first time . . . Most all the theories of origin, migration, and accumulation are dealt with in the text, but there's still much to learn about individual fields. This latter item will be the subject for outside reading. Current activity will be followed in the Journal. The students will keep a record of all new production and its stratigraphic horizon for a 4-month period. When they're finished . . . they'll have a very good idea of geology and geography of oil production in U. S. and Canada.

I was certainly glad last year when you indicated that the Journal would be willing to help my students accumulate knowledge . . .

William R. Higgs
Professor of Geology
Louisiana Polytechnic Institute.

Engineers get higher pay

"Since the 1955 Salary Survey, engineering salaries have shown a marked increase. As in previous years, the greatest per cent increases were recorded in the lower professional grades. Unlike previous years, however, the per cent increases remain relatively high up through Grade VIII.

"(The grades run through IX, ranging from Grade I, which includes supervised positions requiring professional training but little or no experience, to positions of administrative and professional direction of an important organization and positions requiring highly specalized professional engineering or scientific ablity. Grade IX represents top salaried employes charged with responsibility for major projects. Grade VIII includes assistants to technical and administrative heads.)

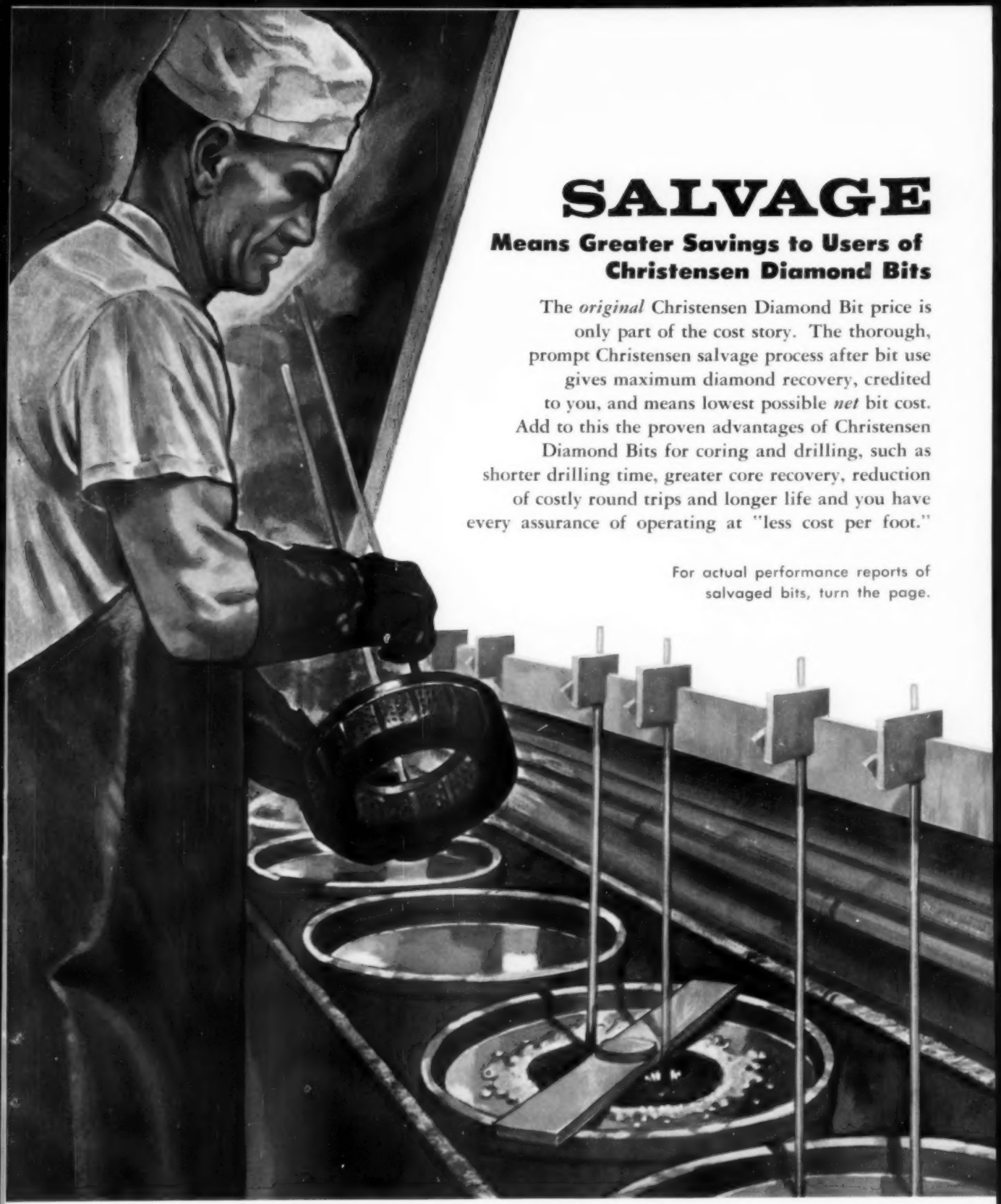
"The range is from about 20 per cent for Grade I to about 14 per cent for Grade VIII. This is an indication that the pressures producing the upward trend of salaries, originally felt only in the immediate post-graduation levels, now are being felt throughout the entire salary scale. The national average median entrance rate to Grade I shows the greatest 2-year increase in dollars since the survey began."

American Society of Civil Engineers, fourth biennial report of committee on salaries.

Texas gas for Texas plants

"Finding an intrastate market for his gas is one way a producer can avoid the FPC muddle and receive what he thinks is a fair return on his investment. Evidence of this is easy to find in Texas . . .

"More than half of the natural gas



SALVAGE

Means Greater Savings to Users of Christensen Diamond Bits

The *original* Christensen Diamond Bit price is only part of the cost story. The thorough, prompt Christensen salvage process after bit use gives maximum diamond recovery, credited to you, and means lowest possible *net* bit cost. Add to this the proven advantages of Christensen Diamond Bits for coring and drilling, such as shorter drilling time, greater core recovery, reduction of costly round trips and longer life and you have every assurance of operating at "less cost per foot."

For actual performance reports of salvaged bits, turn the page.

Illustration shows used bit ready for immersion in electric acid bath which releases the diamonds from the matrix metal.

Do you have our catalog? Write today for SD-608.

CHRISTENSEN DIAMOND PRODUCTS

LESS COST PER FOOT CHRISTENSEN DIAMOND PRODUCTS

1937 SOUTH 2nd WEST SALT LAKE CITY, UTAH

Diamond recovery rates

vary according to the condition of the used bit returned for salvage. No matter what condition the bit is in, the Christensen salvage process guarantees maximum diamond recovery.

When bit arrives for salvage a permanent tag is secured showing customer name, bit type and number and original carat weight.

Important steps in the salvage process shown here, first the shank is cut from bit crown, bit is immersed in electric acid bath and diamonds drop to bottom of tank.

Suction recovery from tank puts diamond into fine screen containers, then diamonds are meticulously hand sorted from foreign matter, accurately weighed, then credited to the customer.

Salvage reports of 4 different bits from diverse conditions

CORE BIT	5-9 16" x 2¼"
AREA	Sabine Parish, Louisiana
FORMATION	Fredricksburg - Wilcox
BIT PERFORMANCE	254 feet @ 2-8 ft. hr.
BIT CONDITION UPON RETURN FOR SALVAGE:	
EXCELLENT X GOOD FAIR POOR	
PERCENTAGE DIAMOND RECOVERY	59%
ORIGINAL BIT COST	$1674.30
NET BIT COST	$863.40
NET BIT COST PER FOOT	$3.39

CORE BIT	7¾" x 3½"
AREA	Wichita County, Texas
FORMATION	Cisco Sand
BIT PERFORMANCE	697 feet @ 6 ft. hr.
BIT CONDITION UPON RETURN FOR SALVAGE:	
EXCELLENT X GOOD FAIR POOR	
PERCENTAGE DIAMOND RECOVERY	63.3%
ORIGINAL BIT COST	$2846.99
NET BIT COST	$1298.94
NET BIT COST PER FOOT	$2.01

CORE BIT	8⅝" x 4"
AREA	Roosevelt County, Montana
FORMATION	Lime, Dolomite
BIT PERFORMANCE	400 feet @ 2-6 ft. hr.
BIT CONDITION UPON RETURN FOR SALVAGE:	
EXCELLENT X GOOD FAIR POOR	
PERCENTAGE DIAMOND RECOVERY	67.3%
ORIGINAL BIT COST	$3788.05
NET BIT COST	$1507.45
NET BIT COST PER FOOT	$3.77

CORE BIT	6½" x 3½"
AREA	Weld County, Colorado
FORMATION	D & J Sands
BIT PERFORMANCE	407 feet @ 3 ft. hr.
BIT CONDITION UPON RETURN FOR SALVAGE:	
X EXCELLENT GOOD FAIR POOR	
PERCENTAGE DIAMOND RECOVERY	80.2%
ORIGINAL BIT COST	$1500.36
NET BIT COST	$697.11
NET BIT COST PER FOOT	$1.71

1937 South 2nd West Salt Lake City, Utah

CHRISTENSEN DIAMOND PRODUCTS

being produced in Texas now is marketed within the state's borders and the list of manufacturers who have moved their facilities to Texas—or have opened new installations there—keeps growing. At the end of 1956, Texas led the country in new construction of petrochemical plants, voracious users of natural gas."

Article in the Texas Star, magazine of The Texas Co.

CALENDAR

AUGUST

1-3	Rocky Mountain Mineral Law Foundation, third annual institute, Montana State University, Missoula, Mont.
19-20	North Dakota Oil and Gas Association, annual meeting, Bismarck, N. D.
26-28	Seventeenth annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.
28-30	Instrument Society of America, International Symposium on gas chromatography, Kellogg Center, Michigan State University, East Lansing, Mich.

SEPTEMBER

3-5	Pacific Coast Gas Association convention, Fairmont and Mark Hopkins Hotels, San Francisco.
5-7	New Mexico Geological Society, eighth annual field conference, southwestern Colorado.
8-13	American Chemical Society, 132nd national meeting, New York City.
9-10	Independent Natural Gas Association of America, annual meeting, Shamrock Hilton Hotel, Houston.
9-11	American Institute of Electrical Engineers, conference of the petroleum industry committee, Sheraton Hotel, Philadelphia.
11-13	National Petroleum Association, fifty-fifth annual meeting, Traymore Hotel, Atlantic City, N. J.
19-21	Rocky Mountain Oil Show, fairgrounds, Casper, Wyo.
22-25	American Society of Mechanical Engineers, petroleum mechanical engineering conference, Mayo Hotel, Tulsa.
23-25	American Society of Mechanical Engineers, fall meeting, Statler Hotel, Hartford, Conn.
25	Natural Gasoline Association of America, regional meeting, Northern Hotel, Billings, Mont.
26-27	Western Petroleum Refiners Association, Rocky Mountain regional technical-industrial relations meeting, Henning Hotel, Casper, Wyo.
26-27	Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, Roosevelt Hotel, New Orleans.
30-Oct. 2	American Oil Chemists' Society, 1957 fall meeting, Netherland Plaza Hotel, Cincinnati.

OCTOBER

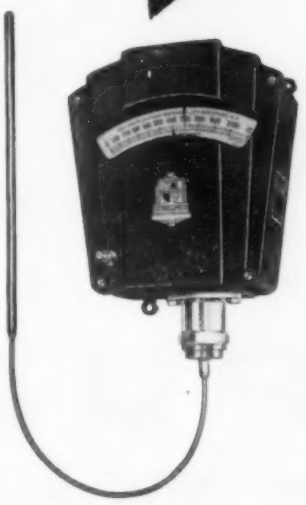
1-2	Texas Mid-Continent Oil and Gas Association, thirty-eighth annual meeting, Texas Hotel, Fort Worth.
1-4	National Association of Corrosion Engineers, north-central region, Sherman Hotel, Chicago.
1-4	National Association of Corrosion Engineers, south-central region, municipal auditorium, Oklahoma City.

NEW!

MODEL HL15-10

partlow

the pioneer in mercury thermal controls



Fast-acting precision limit control for protecting processing operations

- Ideal for positive high temperature limit control in processing of high-cost materials . . . protects against loss or damage to equipment or materials.
- Cuts off heat supply if pre-set temperature is exceeded.
- Element failure safety feature.
- Indicates process temperature at all times.
- Equipped with manual reset button.
- Fully adjustable over entire scale range.
- Available in scale and element ranges of 0 to 900°F. and 0 to 1100°F.
- For use with gas, oil, steam or water valves; or electrical equipment.

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THE PARTLOW CORPORATION

Dept. G-757 New Hartford, N. Y.

Offices in All Principal Cities

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

"REPUBLIC IS A 'MAJOR' IN CASING AND TUBING PRODUCTION"

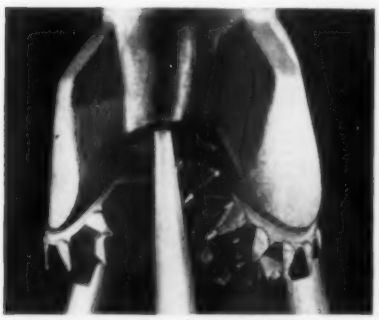
"As a matter of fact, in the production of casing and tubing, Republic has grown even faster than you."

Last year, the amazing oil industry drilled over 235,000,000 feet of hole in the United States alone. This giant total reflects tremendous progress made by the industry in the relatively brief interval since World War II. For example, in 1943 total footage amounted to only 61,991,857 feet.

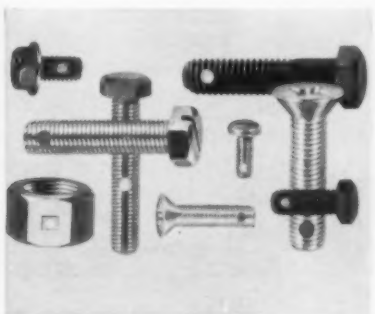
Republic has more than kept pace with this growing demand for ever-larger quantities of high-quality casing and tubing. Through a combination of new mills and improved methods, Republic stands today as a major factor in casing and tubing production – ready and able to meet virtually any requirement.

Throughout this dynamic shift in market position, only Republic's unexcelled quality has remained the same. Whether you specify electric weld or seamless, you can count on peak performance in every foot of Republic Casing and Tubing.

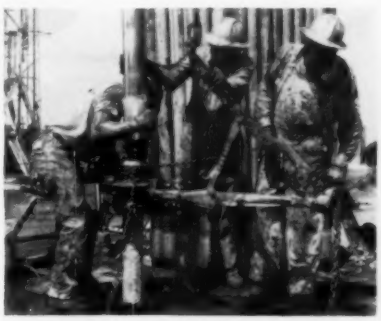
Your local Republic representative or oil country distributor will be glad to furnish full information on Republic's outstanding line of oil country tubular goods. Or mail coupon for data.



TREMENDOUS STRENGTH of Republic Alloy Steels helps to increase efficiency in a wide variety of oil field equipment. This characteristic permits equipment-designers to reduce cross-sections and weight, with no loss in impact and stress resistance. Result is greater speed and ease of handling. Applications include bits, blocks, tongs, and chain. Send coupon for data.



GREAT LOCKING POWER of Republic Nylok® Bolts and Nuts provides shakeproof performance in products and components subject to severe impact and vibration. Nylon pellet in body of bolt or nut forces tight metal-to-metal lock between opposite mating threads. Resiliency of nylon permits easy disassembly, adjustment, and re-use. For full information, mail coupon.



ALL SIZES AND TYPES of chain for every oil field application are produced by Republic's Bolt and Chain Division. They include spinning-chain, load-binding chain, cat-line chain, blowout preventer anchor chain, boomer chain, tow chain, truck and tractor tire chains, and general duty pick-up chain. All are available with necessary fittings. Send for details.

STEEL

and Steel Products

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Please send me further information on:

☐ Electric Weld Casing and Tubing
☐ Seamless Casing and Tubing ☐ Alloy Steels
☐ Nylok Bolts and Nuts ☐ Chain Products

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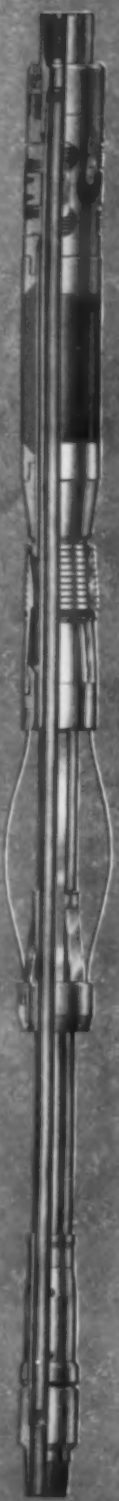
City_____ Zone_____ State_____

THE BROWN BOLL WEEVIL PACKER



RUGGED... DEPENDABLE

Here is a packer that is really made to do a tough job. Its sturdy, rugged design incorporates features that make this a highly desirable packer to use.

Rugged features—check 'em!

1. Built-in hydraulic hold-down — actuated by pressure *below* the packer. The hold-down slips are not exposed to fluids and solids in the tubing.
2. Built-in safety — if necessary, the stem may be unlatched from the packer providing a short stroke jar and a by-pass for circulation. Stem automatically relatches when setting back down.
3. Built-in strength — a tough compression type seal holds against the highest pressures. It can be set and reset numerous times with assurance that it *will hold*.
4. "Boll Weevil" setting and releasing features. Just pick up the tubing and set it down. No rotation or other tricky manipulation to set or pull the packer.
5. Full-opening, too!

Dependable applications—check 'em!

For high pressures of squeeze cementing, fracturing, acidizing and testing.

For selective treating, the "Boll Weevil" is ideal as top packer in a two packer hook-up. "Straddle" jobs are simplified with the unbeatable combination of the *Boll Weevil* and the *Brown BP-4* Bridging Plug Packer. Work easily above or below either packer, run them together, pull them together or leave them as production packers.

For any production job you have. It's especially suited to deep, crooked or deviated, high pressure wells.

BROWN
OIL TOOLS, INC.

8490 KATY ROAD
HOUSTON, TEXAS

2-4 Golden Trend Oil Show, Pauls Valley, Okla.

6-9 Society of Petroleum Engineers of American Institute of Mining, Metallurgical, and Petroleum Engineers, fall meeting, Adolphus, Baker, and Statler Hilton Hotels, Dallas.

7-9 National Electronics Conference, thirteenth annual meeting, Hotel Sherman, Chicago.

7-9 American Gas Association, annual convention, Kiel Auditorium, St. Louis.

7-11 American Institute of Electrical Engineers, fall general meeting, Morrison Hotel, Chicago.

10-11 California Natural Gasoline Association, thirty-second annual fall meeting, Huntington-Sheraton Hotel, Pasadena.

10-12 American Society of Mechanical Engineers, American Institute of Mining, Metallurgical & Petroleum Engineers, fuels conference, Chateau Frontenac, Quebec.

10-13 Louisiana Gulf Coast Oil Exposition, Lafayette, La.

13-15 American Association of Oilwell Drilling Contractors, seventeenth annual meeting, Mayo Hotel, Tulsa.

13-19 OIL PROGRESS WEEK.

17-18 American Institute of Mining, Metallurgical, and Petroleum Engineers, Southern California petroleum section, fall meeting, Biltmore Hotel, Los Angeles.

17-19 Four Corners Geological Society, second field conference, Gallup, N. M.

18 American Institute of Chemical Engineers, South Texas section, twelfth annual technical meeting, Moody Convention Center, Galveston, Tex.

20-22 National Association of Oil Equipment Jobbers, annual convention and trade show, Hotel Peabody, Memphis

23-25 National Association of Corrosion Engineers, western region, seventh annual conference, U S. Grant Hotel, San Diego, Calif.

23-25 National Association of Corrosion Engineers, seventh biennial Permian basin corrosion tour, Midland-Odessa area, Texas.

24-25 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Rufus Garrett Hotel, El Dorado, Ark.

25 Natural Gasoline Association of America, southern regional meeting, Washington - Youree and Captain Shreve Hotels, Shreveport.

27-29 Independent Petroleum Association of America, annual membership meeting, Statler Hilton Hotel, Dallas.

31-Nov. 1 American Association of Petroleum Geologists, Mid-Continent regional meeting, Education Building, Fairgrounds, Tulsa.

NOVEMBER

3-8 Society for Nondestructive Testing, second international conference, Hotel Morrison, Chicago.

6-8 Gulf Coast Association of Geological Societies, seventh annual convention, Roosevelt Hotel, New Orleans.

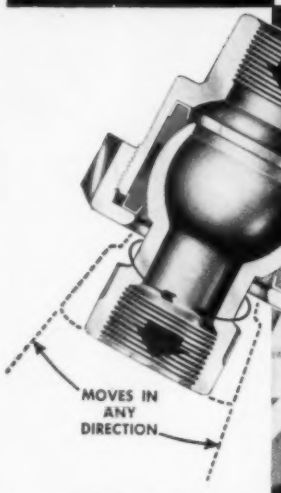
6-8 Society of Automotive Engineers, national fuels and lubricants meeting, Hotel Statler, Cleveland.

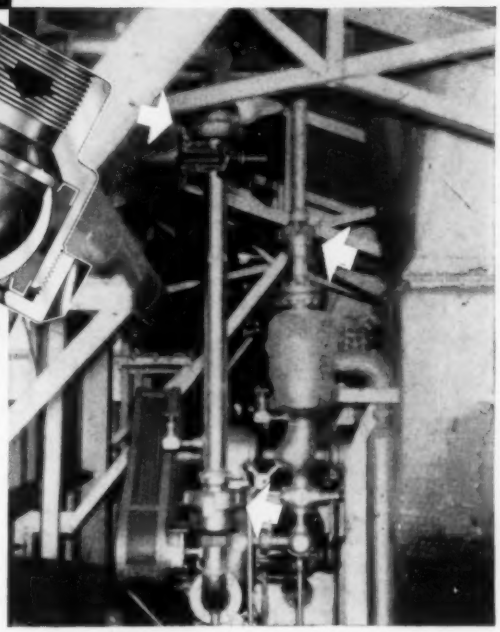
11-14 American Petroleum Institute, thirty-seventh annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.

12-14 National Association of Corrosion Engineers, northwest region fall meeting, Penn-Sheraton Hotel, Pittsburgh.

22 Natural Gasoline Association of America, Panhandle Plains regional meeting, Herring Hotel, Amarillo, Tex.

BARCO *Flexible* BALL JOINTS





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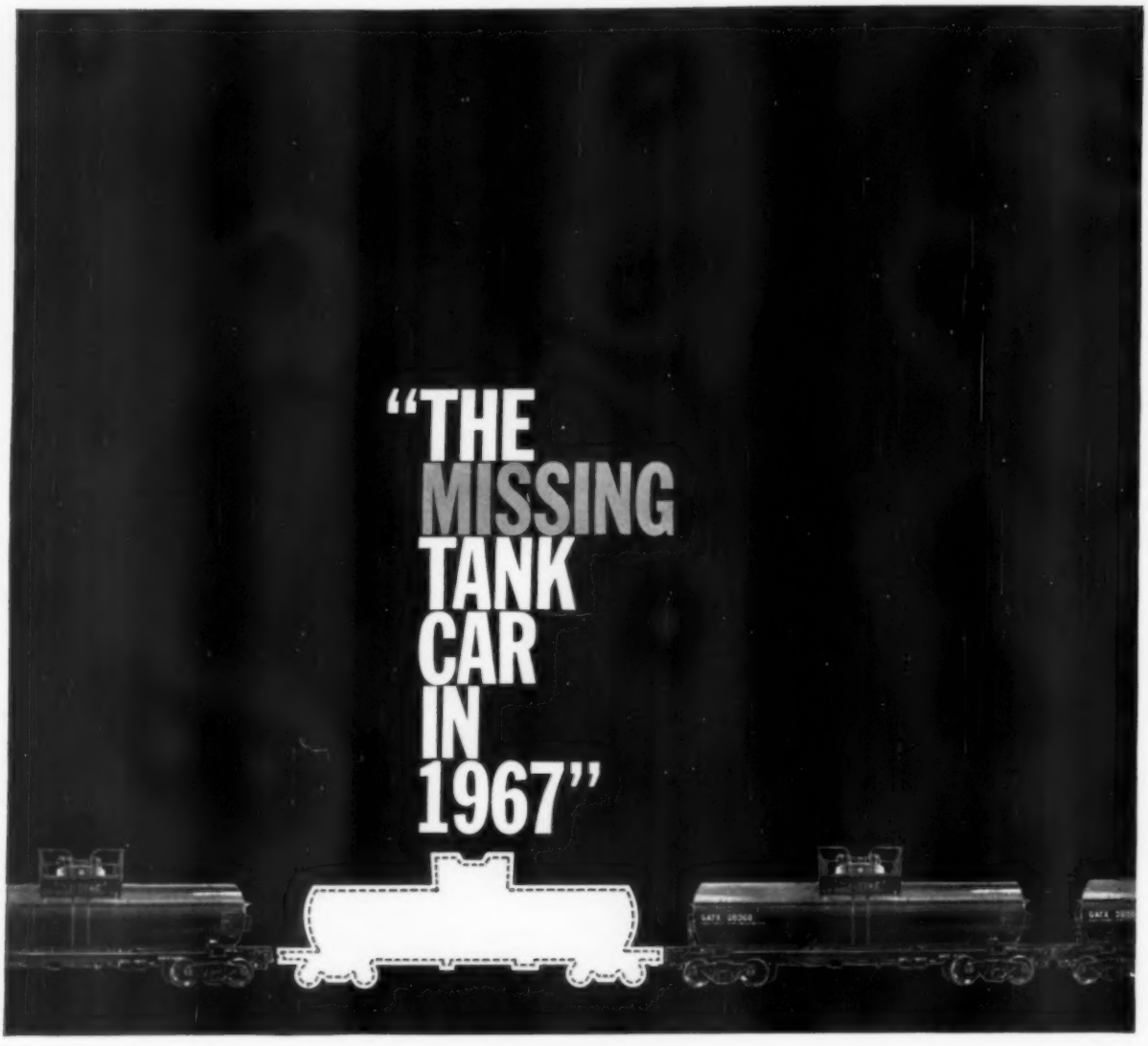

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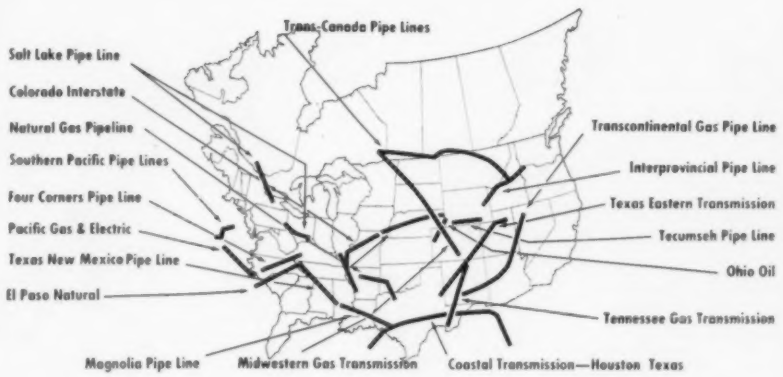


Map of the Future

STUDY this pipeline map carefully. It has an important bearing on the review and forecast material in this special Midyear Issue. Would you say it shows:

. . . The United States turned inside out by a Senate investigation?

. . . . The whole industry made topsy-turvy by imports?

. . . . Pipelines out in the ocean to bring in offshore crude?

None of those. It's just an engraver's error. To see the way it ought to look, turn to page 180. And while you're in that vicinity, take a good look at all the other pages fore and aft that condense reams of data about where the industry has been and where it's headed this year.

To understand how a map could possibly come out base backwards like this, you have to understand some of the great pains our staff takes to present this Midyear material in usable and attractive form.

On page 180 you'll notice that the outline of the map is not as black as the pipelines and lettering. This was not accomplished by printing it in gray ink. It was done by the Ben Day process, to use a technical expression. The map was drawn on paper and the rest on a transparent overlay, and the engraver made a double engraving. Only in doing so the engraver flopped the negative, to use another technical expression.

The funny thing is that about six guys handled this cut without noticing that anything was wrong.

Of course it would be a lot cheaper to make a simple cut in solid black and white. But it wouldn't be so effective. The combination cut emphasizes the things we want to show on the map. Just one little example of some of the pains we take to make our favorite oil publication more readable and more serviceable.

For other examples, look at any one of the 50 pages of special material in this issue. In fact, you had better look at all of them.

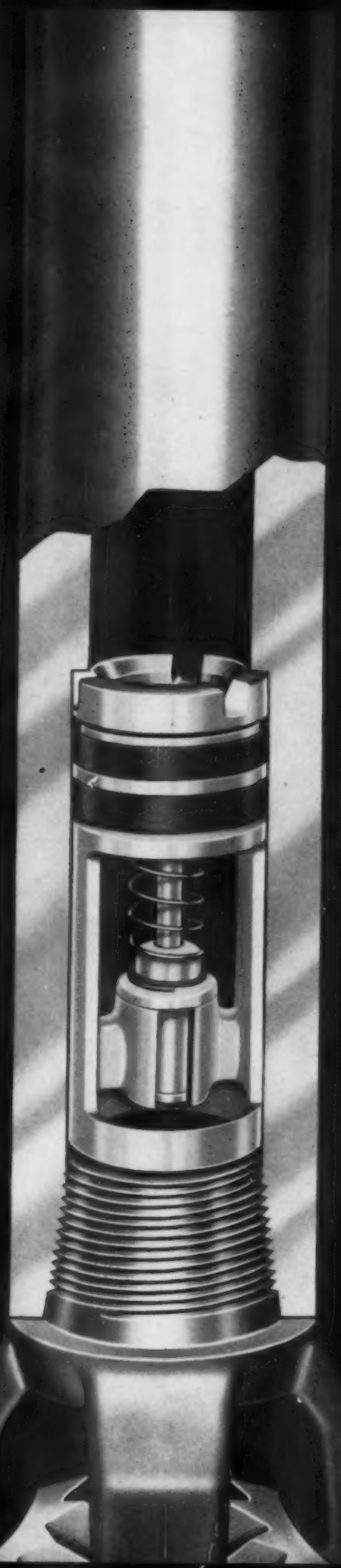
They all contain facts and figures, reviews and forecasts, having a direct bearing on your business. They tell exactly where the industry stands in the middle of this eventful year of 1957—how it got the way it is and what is likely to happen the rest of the year.

And right plumb in the middle of it all—so you can't possibly miss it—is a superspecial 16-page forecast of trends in the industry for the next 10 years or so.

Whatever you do, don't fail to study this "Long Look Ahead." It's by our own John Casper, petroleum economist par excellence and a forecaster among forecasters.

You've seen other long-range forecasts. Now read this and see if it doesn't read easier, make more sense, and pack more useful guides for operating oil men than any of the others. And we'll bet you won't find any backward maps or similar booboos in it. Just wait 'til 1965 and check.

—Henry D. Ralph.



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Let's be realistic about an imports cut

BEFORE anyone gets too excited over a curtailment of oil imports it would be wise to take a good look at the industry's present statistical position and the outlook for the coming fall and winter.

The cold fact is that the available supply is so far out of balance with the prospective demand that it will take until next spring, at least, for either domestic producers or the consuming public to see any tangible effects from a small curtailment of crude imports.

The aftermath of Suez, plus other abnormal conditions, has created a situation that can't be worked out of for many months. A slow-down in imports will be a helpful tonic, not drastic surgery.

HERE'S THE PICTURE: After the Suez Canal reopened and Europe stopped buying U. S. crude, domestic production was not cut back fast enough from the all-time high of the first quarter. Middle East imports resumed their pre-Suez rate, and Venezuelan imports have been far above any previous level.

On top of this, domestic demand has been way below expectations all this year. For the first half, actual demand was only 1.1 per cent above last year, whereas the industry had planned for an increase of 4 per cent. This is a market loss of 250,000 bbl. per day—a figure to be kept in mind when calculating the effect of an imports cut.

(Why demand is off is a puzzle—probably a combination of weather, shifting motoring habits, and the "sidewise" movement of general business activity. Domestic production will doubtless pick up by winter but currently its slackness is a serious factor.)

The combination of too-long-sustained high domestic production, increased imports, loss of the temporary European export market, and drop in domestic consumption has raised inventories of crude and products to the point of glut—equivalent to 3 months' consumption at the current rate of demand. It will take a long time to work these stocks down to normal.

Currently crude imports are averaging around 1,200,000 bbl. per day. If they are held to 1,000,000 bbl. per day in coming months, domestic crude production will need to average only 7,200,000 bbl. per day during the fourth quarter of this year.

THAT'S A SMALL INCREASE. It's only 300,000 bbl. per day more than the current rate. And it's 325,000 bbl. per day below the first half of this year.

On that basis, 1957 will show domestic crude output up only 1.9 per cent over 1956 but crude imports up 7.7 per cent. And in the first quarter of 1958 domestic production at the forecast 7,400,000 bbl. daily will be 2.9 per cent below last spring's level.

So a small curtailment of imports is no bonanza for producers, no pinch on consumers, but just one step in balancing supply with demand.

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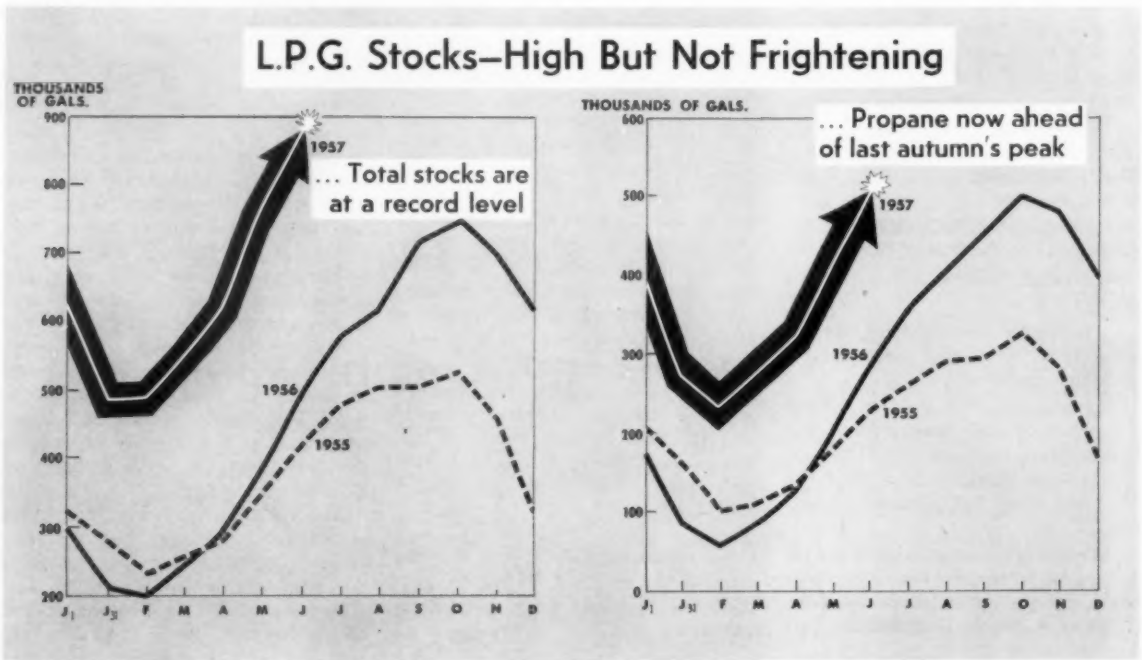


Spectacular jumps in L.P.G. stocks at the height of the summer off-season have many suppliers asking:

Will stocks overflow all available storage?

Will production ease off to stop the stock buildup?

Are new uses of L.P.G. coming on the scene to change the cycle of heavy winter use and big summer pile-up of stocks?

These and other questions in the seeming crisis in L.P.G. are answered by the Journal's economist in this article. There are several signs that indicate the industry can weather the trouble.

New Demand Pattern May Help L.P.G.

John C. Casper

BY SOME STANDARDS there's an aura of crisis for the L.P.G. industry in the rapid rise in stocks this summer.

The heavy product inventories have called attention to this segment of the industry and raised questions whether serious market troubles lie ahead.

It's certainly no time for panicky action.

What many people forget is that the L.P.G. industry in the last few years has changed its storage pattern.

In the past L.P.G. suppliers and distributors depended on above-ground pressure storage to handle any off-season accumulation of products. This was so expensive that refinery and terminal stocks were kept at very low levels.

So there was a tendency to panic if stocks were not at rock bottom at the start of the off season. Many will recall when L.P.G. marketers once even were caught up in their own panic. Near the end of a warm January with stocks rather high, many marketers cut prices to move out their supplies. Then came a very cold February that crowded the industry to meet its contracted obligations.

With the development of underground storage, however, the industry has shifted to a broader program of

stock buildup in the summer and withdrawals in the winter.

A few years ago the situation faced by the industry today would have been intolerable. This year the L.P.G. industry has experienced sharp increases in stocks, piled on top of heavy inventories left over from the heating season.

Stocks are at an all-time high. They will go higher before the heating season. But the material may be needed before the next winter is over.

There are two sides to the problem. Let's take a look at the dark side first.

What's happening . . . This is the current situation:

. . . Stocks of L.P.G. reached their record high at the end of June.

. . . Storage will overflow if this buildup continues.

. . . Scramble for available storage space this fall could create severe marketing problems.

The total of all L.P.G. in storage at the end of June amounted to 887 million gallons, or about 136 million gallons more than at the end of October last year, the previous all-time high.

Stocks of propane, the chief L.P.G. fuel, alone totaled slightly more than 500 million gallons at the end of June. This also was more than held in storage last October.

This is running counter to former patterns. Stocks usually drop to a low point for the year at the end of February, the end of the heating season and the time when demand is heaviest. Additions to stocks are small in March and April. The big buildup comes in the 6-month period from May through October, hitting a peak in the fall just before the heating season starts to draw them down.

But at the end of June stocks already exceeded last year's peak, with 4 months still left of the buildup season.

This cycle of buildup and withdrawal is shown in the accompanying charts for 1955-57. The propane chart also reflects some of the changes in demand caused by abnormal weather. Colder-than-normal weather in the 1955-56 winter produced the big drop in propane stocks in December 1955. Stocks remained below levels for the previous year through April.

They started a sharp climb in May. Before the buildup season ended, twice as much propane went to storage as in 1955. The additions in 1956 totaled 374 million gallons compared with 188 million gallons the year before.

With all these stocks, L.P.G. suppliers were all set for a big season last winter. But the weather didn't cooperate, and that started the chain of events which has brought on this summer's heavy stocks.

Temperatures last winter were above normal for most of the heating season. L.P.G. marketers actually had only one good sales month during the winter.

Total demand for L.P.G. as a result was 2.4 per cent below the 1955-56 heating season. This meant smaller withdrawals from storage. Propane stocks at the end of last February amounted to 234 million gallons or 173 million gallons more than the year earlier.

The mild winter was followed by unseasonable weather in the spring. Heavy rains over much of the Southwest in the second quarter reduced L.P.G. consumption for irrigation projects, plowing and other farm uses.

This surplus at the end of winter has been compounded by big increases in stock buildups through the spring and summer. Propane stocks at the end of June had risen to 215 million gallons more than for the same month last year.

Other products gain . . . The story on propane is matched by other light products. They are filling more storage than normal.

Butane stocks amounted to 336.1 million gallons at the end of June. They were 167 million gallons at the same time last year. Stored butane has more than doubled since last June. This net increase of 169.1 million gallons is 79 per cent of the gain in propane stocks.

Stocks of L.P.G. products other than propane and butane show a gain of 5.9 million gallons for the past 12 months.

This picture of total L.P.G. stocks is shown in the chart for all liquefied petroleum gases. The total L.P.G. in storage at the end of June is 136 million gallons more than at the end of October last year, the previous all-time high.

What about storage? . . . The question at midyear is: Will operators have enough storage space to hold surplus production until the end of October?

Last year total L.P.G. stocks increased 254.8 million gallons between the end of June and the end of October. If additions for the 4-month period this year are that large, total L.P.G. stocks will climb to about 1,142 million gallons by October 31.

But there are some favorable indications the industry will have the storage and ride out the trouble.

Demand patterns may change. For instance:

. . . Some L.P.G. jobbers apparently haven't done much toward filling consumer storage. This lack of early summer selling could mean more deliveries than normal in August and September.

. . . More L.P.G. is headed into miscible-phase displacement programs. Producers are becoming more interested in this method of boosting ultimate recovery of oil fields.

Continental Oil Co. plans to pump 4,200,000 gal. of L.P.G. into the Hunton lime in a 640-acre pilot section of Short Junction field in Oklahoma. Sunray Mid-Continent Oil Co. will inject 1,386,000 gal. into the Gallup sand of a pilot quarter section in Bisti field.

These two are the more recent announcements of using L.P.G. in secondary-recovery efforts. Every new program with some variation of miscible-phase displacement means greater demand for field use of L.P.G.

. . . The weather has started cooperating. Hot, dry weather in July in the Southwest has given a boost to demand for irrigation.

The L.P.G. production picture also is changing.

Crude output will be down in July, August, and probably September. The Texas Railroad Commission has cut allowables there to 13 days for July and August. This will reduce the volume of oil-well gas available at natural-gasoline and cycling plants. Less gas will mean less L.P.G.

Other states also will have to adjust allowables to bring crude production in line with demand in the third quarter. This should mean that total output of L.P.G. will be cut enough to reduce the rate of stock buildup.

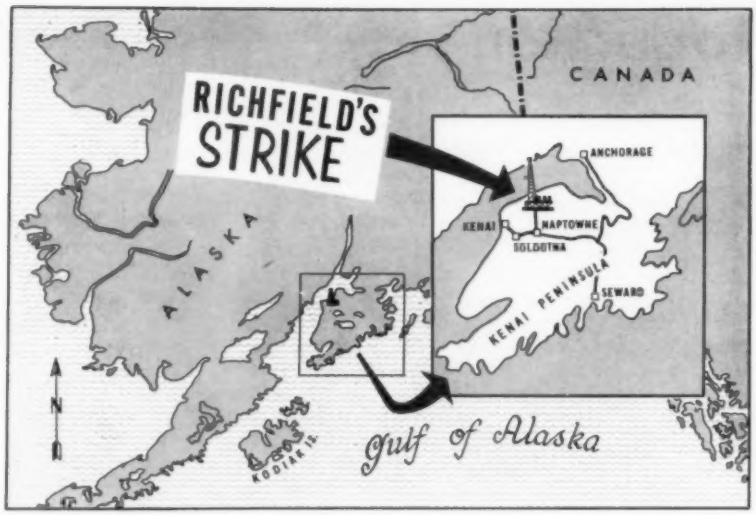
Storage capacity is changing too.

There'll be more space this year than last. Not all underground storage was filled last year when L.P.G. stocks amounted to 751 million gallons. Total capacity at that time probably was between 900 and 1,000 million gallons. About 200 million gallons of capacity has been added by new units or expanded capacity in old caverns since then.

The outlook . . . These shifts in demand, production, and storage space will provide a theoretical home for all surplus L.P.G. between now and the end of October.

But the problem will be getting the surplus products to the place where space is available and get them there at the right time.

That will take some expert planning and may create a few headaches.



Kenai test is promising:

Richfield Finds Oil in Alaska

ANCHORAGE. — Richfield Oil Corp. may have a discovery in its first test in the Kenai National Moose Range 40 miles southwest of Anchorage.

On a formation test at 11,140-70 ft., the 1 Swanson River Unit flowed 31°-gravity crude at the rate of 200 bbl. daily. The wildcat is drilling ahead.

Richfield's president, Charles S. Jones, said "It is not possible from the present status of the well to appraise the significance of the test."

Richfield owns 89½ per cent interest in the 71,680-acre unit on which the test is located. The remainder is held equally by Union Oil Co. and Ohio Oil Co. Richfield also has substantial acreage under lease on other federal lands outside the Swanson River Unit.

The Kenai National Moose Range was opened in July 1956. Richfield, as operator for the three-company unit, spudded the test April 5 of this year. Sunray Mid-Continent Oil Co. participated in the test with dry-hole money.

The nearest wildcat to the 1 Swanson River Unit was drilled about 100 miles away. Standard Oil Co. of California is the major lease-holder in another area in the Kenai Peninsula.

Previous production . . . Richfield's well, even if successful, won't be Alaska's first commercial producer.

Chilkat Oil Co. once had 19 small producers, out of 31 wells drilled, in the Katalla area of Southeast Alaska and even had a topping plant to handle the production.

The wells, located in Katalla field in the vicinity of oil seeps, supplied the plant with about 154,000 bbl. of oil from 1914 to 1933, when the plant was destroyed by fire.

Chilkat's first well was drilled in 1901 to a depth of 366 ft. The others, drilled between 1901 and 1919, ranged in depth down to 1,810 ft.

Chilkat's operations were in the area where Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc., launched the first privately financed big-scale search for oil in Alaska. The companies recently abandoned the third wildcat on their million-acre tract in the area (OGJ, Apr. 1, p. 85).

Pipe to Go Cheaper

ICC orders lower freight rates on oil-country pipe

WASHINGTON.—Railroads serving the Southwest were ordered last week to work out lower freight rates for oil-field pipe.

The Interstate Commerce Commission directed the roads to write new rates for shipments originating at all pipe-producing points east of the Rocky Mountains. The new rates, however, are not to be as low as the combination barge-truck charges for the same traffic.

The ICC approved a lower rate schedule in 1955. But the new rates were on the barge-truck levels and eight barge lines challenged them in the federal District Court at Houston. The court held the rates invalid and the case is now on appeal.

New Benzene Entry

Gulf set to become one of nation's largest producers

PORT ARTHUR, Tex.—Gulf Oil Corp. soon will take another step into the booming petrochemical industry with construction here of a large benzene plant.

Work will start in the near future on the installation, which will have an annual production capacity of about 30 million gallons of benzene. Contract for the job has been let to Procon, Inc.

With completion of the plant, scheduled for late 1958, Gulf will become one of the nation's largest producers of benzene. Benzene is a basic chemical raw material used in production of styrene, synthetic detergents, lubricating-oil additives, insecticides, nylon, and other products.

The plant will be built at Gulf's Port Arthur refinery. Feed stock will be drawn from refinery streams.

Gulf announced that the finished product is expected to be the highest-quality benzene commercially available. The plant is also expected to produce large amounts of toluene.

Benzene booming . . . Capacity of the new plant would be about 25 per cent of the nation's current production of benzene from petroleum.

About 114 million gallons, or 35 per cent of the benzene produced in this country in 1956 came from petroleum. It has been estimated that petroleum's share by 1965 will soar to about 300 million gallons.

The trend toward expansion of oil companies into the benzene field is illustrated by Delhi-Taylor Oil Corp.'s new plant at Corpus Christi. The plant, which recently went on stream, is designed to produce 45 million gallons annually of benzene, toluene, and xylene (OGJ, July 22, p. 53).

Gulf said its new venture is part of the previously announced program to increase and diversify its activity in the petrochemical industry. Since the company already is a leading producer of ethylene, Gulf pointed out that its entry into the benzene field will make it a major supplier of the two largest volume organic chemical raw materials in use today.

Gulf's new plant will consist of a catalytic reformer and purification unit. The reformer will use a platinum catalyst to convert a hexane-rich stream to a mixture rich in benzene. The purification unit will employ solvent extraction and distillation to recover benzene from the mixture.

Cost was not disclosed.

Lid Kept on Production

Oil states keep August allowables at July levels; only Louisiana cuts; but all await action on imports control

OIL STATES generally last week imposed a tight rein on August production while awaiting word from Washington on promised federal action to restrict imports.

The administration's newest formula for controlling crude-oil imports has been whipped into shape. It reportedly only waits final clearance through the White House.

State conservation authorities, meanwhile, took this action:

. . . **Louisiana** cut 45,266 bbl. daily from July production in setting allowables for August.

. . . **Texas** held production to July's 13-day pattern in spite of increasing pipeline proration and loss of crude markets in scattered fields.

. . . **New Mexico** rejected a recommended production cut and retained July's 38-bbl. allowable for each well.

. . . **Oklahoma** held production at July levels, although feeling a 30,000-bbl. daily pinch from refinery strikes and refinery cutbacks.

The outlook . . . The general picture of heavy crude surplus was pin pointed in hearings before the Texas Railroad Commission.

Prior to July, Texas never had an allowable of less than 14 producing days. Last month it chopped more than 400,000 bbl. daily off allowables by going to 13 producing days. It was pressed by major crude buyers, with the concurrence of independent producers, to do something to avert a heavy buildup of crude stocks.

The commission followed the same action for August. The August production will increase slightly to 3,067,883 bbl. daily due to production from new wells completed in July. This is 40,097 bbl. daily higher than the initial allowable for July and 7,918 bbl. daily higher than the allowable in effect July 6.

Action again supported . . . The commission's decision again was based on the general wishes of both purchasers and producers.

Eight of eleven crude buyers recommended 13 days. Magnolia Petroleum Co. sought 12 days. Shell Oil Co. and Sun Oil Co. asked for 14 and 15, respectively.

Independents also supported a low allowable as the lesser of two evils. E. Bruce Street, president of the West Central Texas Oil and Gas Association, told the commission drilling in West Central Texas is off 50 per cent because of low allowables. But, he said, the association has to support a low allowable, even though it hurts, because of "bitter experiences with pipeline proration and selective buying when allowables exceed market demand."

A Slick Oil Corp. spokesman said his company has been unable to sell oil from a recent large Ellenburger discovery in West Texas' Pecos County. He said Cities Service Oil Co. is taking oil now only ¼ mile away but has refused to buy from the discovery. Meanwhile, he said, the company is proposing to import 32,000 bbl. daily.

Testimony developed that production in some North Texas areas has been prorated back by 40 to 60 per cent of allowables and some water floods have shut down. Ralph Harvey, president of the North Texas Oil and Gas Association, said no producer in the area has been able to get a connection for new completions in the past few weeks. The situation grew worse, he said, when a trucking contractor in Knox, Baylor, and Throckmorton counties lost his buyer, Continental Oil Co., and when Magnolia ceased buying 5,000 bbl. of crude daily from Toronto Pipe Line Co.

Shamrock Oil & Gas Corp. has been prorating steadily in the Texas Panhandle at 75 per cent of July allowables.

Other testimony disclosed that leases producing 2,000 bbl. of oil daily in the Panhandle have shut in entirely.

Tough in Louisiana . . . The new allowable of 769,030 bbl. daily for Louisiana is more than 22 per cent lower than the peak of 990,642 bbl. daily produced last March during the Suez crisis.

Despite five consecutive cutbacks, the August allowable will still be higher than the 746,829 bbl. daily authorized for August last year.

Conservation Commissioner John B. Hussey reported that purchaser nominations called for an even greater August reduction to 693,700 bbl. daily.

Hussey announced that double allowables will be restored in August for dually completed wells. The allowable had been set at 1½ times that of single-zone producers during July.

He also called a meeting for this week to hear applications for increased oil allowables to compensate for production losses during Hurricane Audrey. Five producers seek special allowables totaling more than 650,000 bbl.

Other states . . . The Oklahoma Corporation Commission faced the prospect of dwindling markets for its state oil in setting August allowables.

Conservation Director Massena Murray reported that production in August on the July basis should average nearly 600,000 bbl. daily.

Purchasers nominated 538,043 bbl. daily for August, and the Federal Bureau of Mines forecast a demand for Oklahoma oil in August of 565,000 bbl. daily, a 25,000-bbl. decline from July forecast. Oklahoma production in July is averaging 563,663 bbl. daily.

The New Mexico commission was urged by its engineer to trim the August allowable to 37 bbl. daily per well. Crude buyers concurred in the request. The commission, however, elected to keep the 38-bbl. daily allowable. This will mean a 5,600-bbl. daily increase in production for August because of new wells.

Controls coming . . . The cabinet committee working on an imports-control plan reportedly overcame several problems last week in whipping the program into shape.

The problems involved imports from Canada and Venezuela and the special needs of the West Coast.

Canadian sources in Washington made it clear they would like, but did not expect, to get special treatment for Canadian oil. They said it was only "realistic" to expect that imports from all sources would get the same treatment.

The new import formula, expected to go into full effect by October 1, will not involve any action on residual fuel oil. This was made clear last week by Mobilization Director Gordon Gray.

A curb on residual imports has been sought for many months by the coal industry. Gray last week wrote Tom Pickett, vice president of the National Coal Association, that he has found no threat to national security in such imports.

The new formula probably will not please congressmen from the oil-producing states on two counts. They do not like the idea of further "voluntary" programs. They feel that imports should be cut further than will be the case. But there are no signs of a congressional revolt against the administration plan this year.

Safety program pays off as . . .

Tidewater Cuts Accident Rate

SAN FRANCISCO. — Tidewater Oil Co. has won national recognition for cutting industrial accidents among its employes last year. But Tidewater is not standing on that record.

The company is driving in 1957 to better its remarkable achievement of 1956.

The National Safety Council presented Tidewater with an award of honor for reducing lost time from accidents last year by 61 per cent below the average of the previous 5 years.

In 1957 the goal is to beat this record by cutting accidents another 25 per cent. To do this, the company has embarked on an accident-control program to eliminate unsafe working conditions and working procedures.

When first established, the program limited formal instruction to supervisors. But for 1957 it was extended to all 9,500 employes of the company.

Supervisors receive a 5-hour basic course in safety, plus periodic refresher courses and instructions to put their studies into action. They must explain safety rules to employes and bear responsibility for seeing that rules are obeyed.

Individual employes entered the formal instruction program this year. The company laid the groundwork at a special safety conference of picked supervisors at Houston.

All employes now are required to attend two 1-hour sessions of safety study. Instructors are well prepared, and discussion is encouraged to help make the employes conscious of their personal safety problems.

TIDEWATER President David T. Staples receives National Safety Council's top award from Iver Larson, council executive.

But safety at Tidewater does not end in the classroom.

Supervisors must file comprehensive reports on accidents, and each month a summary of the reports is compiled for top administrative personnel, including President David T. Staples, the prime mover behind the program.

Teams of supervisors and employes make periodic checks of equipment and working methods. Where safety hazards are found, the teams call on the engineering department to take action. All employes eventually become members of inspection teams.

Statistics show the safety program is paying off. From 1950 to 1955, the frequency of accidents at Tidewater was high. In 1956 the rate was cut by 61 per cent when it fell to 7.08 disabling injuries per 1,000,000 man-hours. This compared with 7.26 for the petroleum industry as a whole.

Tidewater's ultimate goal is four injuries per million man-hours. The goal may be reached under the ambitious safety program now under way.

Cosden Line Let

Company entering Wichita Falls market October 15

BIG SPRING, Tex. — Trust Pipe Line Co., a subsidiary of Cosden Petroleum Corp., has started laying pipe on its 128-mile, 6-in. products line from near Abilene to Wichita Falls.

Construction contract was let to Holder Construction Co., which expects to complete the line by October. With a pump station at Cosden's Hawley refinery, just outside Abilene, capacity of the line will be 8,000 bbl. daily (OGJ, April 22, p. 95).

Cosden engineers will supervise the building of the Wichita Falls terminal, which will have eight 20,000-bbl. tanks. Cosden will market under its own name and supply other companies, whose products will be refined to specification. Products can be shipped from Cosden's Big Spring, Hawley, or Colorado City refineries through an interconnecting pipeline.

The $2,550,000 project is to be operating by October 15. It will give Cosden a market for refinery products beyond its present West Texas area.

J.&L. Buying Plant Site

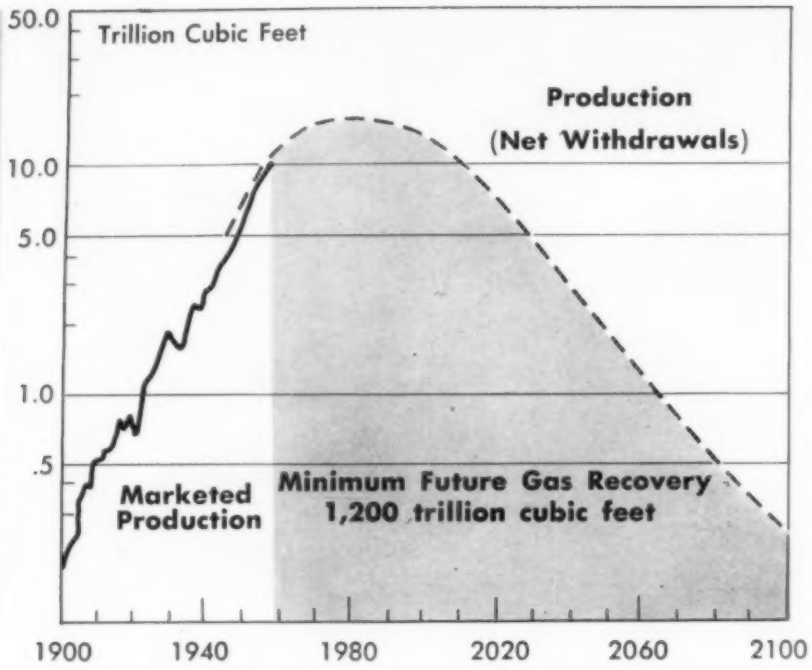
HOUSTON.—Jones & Laughlin Steel Corp. has completed negotiations for about 2,700 acres of land near here as a possible site for a steel mill. The tract is in Chambers County, Texas. It joins Galveston Bay and Cedar Bayou and can be served by the Houston Ship Channel.

The company said the land "is ideally situated for construction of a steel mill."

"While the corporation is not planning to proceed with construction in the near future," the announcement added, "the acquisition of the site is a first step in that direction."

If a steel mill is built on the site it is expected to specialize in production of oil-country tubular goods.

Minimum Estimate of Future U.S. Gas Production



Gas Industry Still Has Growing Room

THE NATURAL-GAS INDUSTRY can expect a rapidly growing and long-time future prosperity.

At least 80 per cent of the gas supply needed for this future progress consists of gas yet to be discovered.

That is the general outlook for gas turned up by the experts at Chase Manhattan Bank of New York. The two men, Lyon F. Terry, vice president, and John G. Winger, petroleum economist, have just completed a detailed study of the industry.

Their findings in a nutshell:

. . . **Demand** will increase 4.7 per cent a year through 1966. Then it will hit an annual total of 16 trillion cubic feet, or 55.3 per cent greater than 10 years before.

. . . **Supply** will keep pace, meaning a production in 1966 of 16.3 trillion cubic feet. This is a jump of 51 per cent in 10 years. Peak production will come between 1980-1990 when 20 trillion cubic feet of natural gas annually will be taken from the earth.

But the bank researchers noted one change in the pattern: "The day of surplus gas and cheap gas is over."

"From here on," they said, "the consumers will have to pay the increasing costs of the producers and explorers, who will need to be accorded sufficient profit and freedom of action to stimulate them to continue exploring for new reserves."

Energy for more people . . . The place of natural gas in the future economic jig-saw puzzle naturally depends on the nation's future energy requirement. This in turn depends on the population growth.

Both show prospects of continued dynamic growth. Public and private sources estimate U. S. population will increase from 168 million in 1956 to 197 million by 1966. What this means to the energy picture is this: More people will add a kick to expanding economic activity, a rising standard of living and greater mechanization. All this will support a growth in energy use averaging 3.8 per cent a year for the next decade.

Translated into B.t.u. this requirement will call for a jump from 42.1 quadrillion B.t.u. in 1956 to 61.3 quadrillion B.t.u. in 1966. Natural gas' share will increase from 9.9 to 15.6 quadrillion B.t.u. in the 10-year period. By way of comparison, oil's share of the energy supply during the same time will advance from 18.4 quadrillion B.t.u. to 30.1 quadrillion. Coal will show a modest gain in demand of 12 quadrillion B.t.u. to 13.8 while water power will remain steady in the 10-year span at 1.8 quadrillion B.t.u.

Terry and Winger estimated the combined demand for oil and natural gas will increase for the next decade at an average of about 4.9 per cent a year. Natural gas alone will increase at a 4.7 per cent rate.

This growth in demand will be less spectacular than in the past. Since 1920, for instance, the marketed production of natural gas has grown at an average rate of 7.2 per cent a year. In the postwar period the average has been 9.5 per cent a year. There are numerous explanations for this. Rapidly expanding pipeline networks penetrated new markets. Gas shoved coal aside in the market place.

Railroad switch . . . The growth of natural gas in the postwar era has far outstripped energy consumption as a whole.

Total energy demand grew only 3.3 per cent a year.

The growth rate of all energy probably was held back by one major factor: Switch by railroads from steam to the vastly more efficient diesel locomotive.

Here's how the railroad fuel switch affected the energy picture:

With no appreciable change in overall traffic, railroads in 1956 consumed less than one-fourth the volume of raw energy they used in 1946.

As a result, the railroads in 1956 accounted for only 2 per cent of national energy consumption compared with 12 per cent a decade before.

The bankers predict there's nothing in sight approaching the magnitude of the locomotive conversion to affect growth of energy consumption. They expect total consumption in the near future to accelerate.

This expected growth in total energy in years ahead assures continued markets for gas, and explains why Terry and Winger put growth of gas demand at 4.7 per cent a year.

But the cream has now been skimmed off. Number of potential conversions to gas from coal has been sharply reduced. Most of the urban markets have been penetrated, and oil will be able to compete more effectively in the rapidly growing suburban areas. Thus the bank study concludes that in the second half of the next decade natural-gas growth will proceed more nearly in line with the expansion rate of over-all energy.

Eggs in the basket . . . The nation could live 22 years off its known gas reserves at present use without finding a new source of supply.

Terry and Winger reported that the country's proved reserves were 238 trillion cubic feet at the close of 1956. This is equivalent to 22 times 1956 production.

This ratio of reserves to annual production has been falling, however, over the past few years. Reserves were 32.5 times annual production 10 years ago. They probably will continue to decline as the gas business expands further.

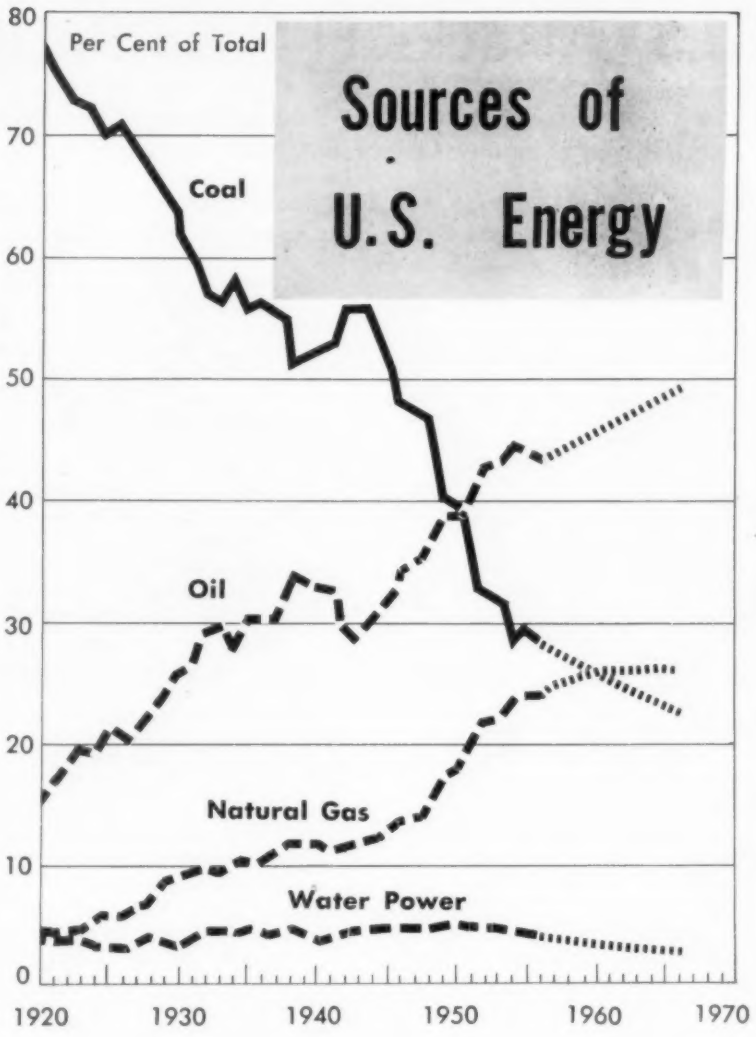
The bank economists emphasized even further declines in the reserves-to-production ratio are not necessarily alarming. But this is true only if the industry continues to replace the gas being withdrawn and increases this supply in proportion to expanding production.

Proved reserves comprise only a small part of the total future supply. The more important part is ability to discover more gas in the future. It is this continuing exploration for new reserves that is so necessary to keep the gas business on a sound basis.

How's hunting? . . . The gas industry has an excellent hunting record.

For the last 10 years additions to proved reserves have averaged 2 cu. ft. per cubic foot of gas withdrawn by production. Actually in 1956 this finding rate was 2.3, and it has been remarkably constant for several years. By comparison, the finding rate for crude oil, according to this study, has averaged 1.45 bbl. added for each barrel produced for the last 10 years. For 1956 the rate was only 1.16.

The expected growth in demand for gas will require an average discovery of 23 trillion cubic feet per year for the next 10 years or a total of 230 trillion cubic feet. That is nearly equal to present proved reserves. This is a large order. But it will require an average ratio of only 1.65 which is well below the industry's consistent performance.



Terry and Winger observed: "For the country as a whole it appears that the industry is well prepared to find the new reserves required for expected growth . . . Of course there will be extensive increases in pipeline facilities . . . And the required new gas supplies will not be attained without considerable and increasing cost."

Finding the required reserves, the authors say, will mean drilling 87,000 wells a year by 1966 or completing 735,000 wells during the next decade. By comparison, the industry drilled 58,000 wells in 1956 for oil and gas.

Rising costs will stem from several factors: Greater depths, more remote land locations, and expensive offshore sites. These are in addition to the burden of other costs affecting drilling.

The whole story . . . The authors estimated that future gas discoveries in this country will total 984 trillion cubic feet. When present proved reserves of 238 trillion are added, the result is a total future gas supply of 1,200 trillion cubic feet.

They base this estimate on a formula of 6 M.c.f. of gas being found for each barrel of oil reserves added. Since it is estimated that 164 billion barrels of oil are still to be found, it follows there should be 984 trillion cubic feet of gas unfound.

Terry and Winger make one observation of the estimate: "The best that one can hope to foresee . . . is a minimum figure which will probably prove to be too low, but which may provide a guide to management and some assurance to consumers and investors."

U.S. Attacks El Paso-Pacific Merger

- **Federal court must decide these questions: Does deal lessen competition, tend to create gas monopoly?**
- **Or does it help assure consumers adequate supply of gas at lower prices than under separate operations?**

WASHINGTON.—El Paso Natural Gas Co. may have to dissolve the merger with Pacific Northwest Pipeline Corp. which made it the world's largest transmission company.

Justice Department officials charged last week that the recent merger carries the seeds of monopoly in gas supply west of the Rocky Mountains.

They filed suit in the federal District Court at Salt Lake City to break the merger. The basic charge: It "may substantially lessen competition or tend to create a monopoly" in violation of the Clayton Act. The California attorney general made a similar complaint early this year.

Here, in brief, are the Government's claims. The merger:

. . . Combines the only two major pipelines in the area under common ownership and control.

. . . Results in common ownership of the only two major pipelines buying gas in the San Juan and other basins.

. . . Gives El Paso permanent access to Canadian gas sources tied to Pacific Northwest and wipes out competition for Canadian gas.

. . . Eliminates actual and potential competition in exploration, production, purchase, and sale of natural gas.

. . . Erases Pacific Northwest as a competitive factor in the gas-supply business in the area.

The Government also claims that El Paso, the only out-of-state supplier of gas to California, was faced before the merger with the effort of Pacific Northwest to sell in that state. A line from the Pacific system to transport Canadian gas into northern California was discussed with California utilities. There was competition between the companies in Utah, as well.

"The combination of the two companies, it is alleged, will enhance El Paso's position to such an extent that potential competitors may be permanently excluded," it was explained at the Justice Department. "Purchasers of natural gas and producers of natural gas in this section of the country will be, according to the complaint, deprived of the benefits of a competitive market."

The department asked the court to require El Paso to get rid of its Pacific Northwest holdings. It warned it will seek an injunction if the companies make any effort to further merge their assets or securities.

El Paso's reply . . . El Paso Natural denied that the merger would substantially lessen competition and tend to create a monopoly.

Paul Kayser, president of the company, pointed out that both El Paso and Pacific Northwest are regulated by the FPC.

"No service may be inaugurated and, once commenced, no service may be abandoned without the permission of that agency. The price of gas purchased by the companies is controlled by the Federal Power Commission and markets served are prescribed by certificates of convenience and necessity. The rates charged by the companies are strictly regulated."

Kayser said that economies resulting from coordinated activities of the two companies are not retained but are passed on to the customers. "In these respects," he argued, "public utilities like El Paso and Pacific Northwest differ from other industrial enterprises."

Kayser expressed confidence that the Clayton Act was "never intended to deprive the consuming public of the benefits of such coordinated activity, supervised as it is by a federal agency established by Congress for that purpose." He warned that the result of halting the merger would be higher costs and diminishing supplies of gas for millions of customers.

Kayser pointed out that El Paso acquired the stock of Pacific Northwest to gain access to the large proved and potential reserves of natural gas in Canada and the Rocky Mountain area through which the Pacific Northwest line runs.

"Access to these reserves is urgently needed by El Paso to meet the growing demands of its markets in California and other points on its system," he stated. "The company is now planning the delivery of 500,000,000 cu. ft. per day of additional gas to these markets, a large part of which will come from Canada and the Rocky Mountain area."

Pacific Northwest also insisted the merger was in the public interest, that it could not "by any stretch of the imagination be other than beneficial to the consumer."

If the merger is broken up, it would leave the companies in the same spot they were in a year ago—El Paso needing reserves and Pacific needing money to finance its expansion.

FPC bypassed . . . The department had to step in because there was no other way of halting the merger, it was explained by Asst. Atty. Gen. Victor R. Hansen, head of the antitrust division.

"The Federal Power Commission is now without power to pass upon El Paso's acquisition of Pacific's stock," Hansen said. "As a result of this acquisition, we allege, producers and consumers within the vast area bounded by Canada and Mexico, and the Rocky Mountains and the Pacific Ocean, are now almost entirely dependent on one company for purchase and sale of natural gas."

It was explained that the FPC would have had veto power over the merger if it had been through the purchase of assets. But it has no control over a merger made by the purchase of stock unless there is a change of operating procedures or a transfer of facilities.

El Paso took over Pacific Northwest last November by acquiring more than 99 per cent of its stock. The FPC was frozen out of the picture because Pacific Northwest was to remain a separate operating company, the Government says.

Most pipeline mergers are voluntarily reported to the FPC, a department official said. This is the first time the department has moved in such a case.

The action answers charges that the administration is opposed to regulation of the gas industry, raised by opponents of the Harris bill, he contended. And it shows how the Government will be able to halt monopoly in the industry if the FPC gives up some of its powers as a result of passage of the bill, he said.

El Paso, one of the fastest-growing pipeline companies in the country, has been expanding not only in pipelining but also in producing, refining, and petrochemicals. Last year the company had total assets of $909.5 million and revenues of over $220 million. It has 6,700 miles of pipeline. The

Government pointed out that it owns more natural-gas reserves than any other pipeline company.

Pacific Northwest, which also has producing and processing interests, has 2,300 miles of pipeline and $248.4 million in assets. It has the only facilities in the West for importing gas from Canada.

New competition in sight . . . El Paso will not remain the sole supplier of out-of-state gas to California if one proposed pipeline is built. And Pacific Northwest will lose its monopoly on importing Canadian gas if another goes through.

Trans-Western Pipeline Co., owned by Monterey Oil Co., Warren Petroleum Corp., and J. R. Butler, Houston consulting engineer, plans to build a gas line from the Four Corners area to California (OGJ, July 8, p. 75).

Trans-Western is trying to sign up reserves to support initial throughput of 200,000,000 cu. ft. per day. The company estimates construction of the line is a year away.

This potential new supply has been welcomed by El Paso's California customers, Southern California Gas Co., Southern Counties Gas Co., and Pacific Gas & Electric Co., which now buy two-thirds of their gas from El Paso. Trans-Western would be in direct competition with El Paso both for reserves and market.

Pacific Gas & Electric itself plans to break the El Paso-Pacific dominance of Canadian gas in western United States. It has already lined up considerable reserves for its proposed 1,300-mile, 36-in. line from western Alberta to Antioch, Calif., near San Francisco (OGJ, July 22, p. 64).

P.G.&E. hopes to have this line operating in 1960 transporting 400,000,000 cu. ft. daily. Much larger volumes are planned later.

This line would also introduce competition in interstate transportation of gas for the California market.

Whether these projects will influence the outcome of the antitrust complaint remains to be seen.

A breakup of the merger could renew Pacific Northwest's interest in building the proposed line directly into northern California to bring Canadian gas to P.G.&E. and the southern California companies. Lines have been proposed from two locations on the Pacific system, Goldendale, Wash., and some point in Idaho.

El Paso, with large reserves of its own in Canada and contracts covering Savanna Creek field in Alberta, also would have an incentive to build its own line from Canada to California or the Pacific Northwest.

California Line Finished

Topock-to-Newhall line will permit southern California utilities to take additional 278,200,000 cu. ft. daily

LOS ANGELES.—A major expansion program to increase gas imports into California will be completed this week by Southern California Gas Co. and Southern Counties Gas Co., subsidiaries of Pacific Lighting Corp.

The final weld has been made on the 241-mile, 30-in. line which extends from Topock, Ariz., on the California border, to Newhall, in the Los Angeles area.

The $33,500,000 project will permit the utilities to increase their takes from El Paso Natural Gas Co. by 278,200,000 cu. ft. daily.

Tying in near Topock with El Paso's 34-in. system from the San Juan basin, the line will supplement the Southern California companies' double line from Blythe, Calif.

At the rate California's demand is growing, the Topock line may be looped in the near future. It will have one compressor station, located near Needles, at first. This station will be powered by four 2,000-hp. gas-engine-driven compressors. Six more units will be added to reach 20,000 hp.

Construction . . . Starting in January, the contractor, R. H. Fulton & Co., used one spread working from Topock west. A second was added in May to speed up the job.

The innocent-looking sandy stretches of the Mojave Desert often concealed layers of rock 1 to 2 ft. below the surface which held up ditching. Varying soil and terrain caused progress to range from 1,000 ft. to 16,000 ft. per day.

Where rock didn't have to be drilled and blasted, the sand itself often caused trouble, particularly during windy weather. Ditching crews had a hard time holding a firm ditch. One 9-mile section in the Ludlow vicinity had to be backfilled, graded, and ditched again. The wind also curtailed welding operations.

The ditch was padded with fine soil, top and bottom, to guard the pipe against rock gouging.

Toughest conditions were met where the line crossed the steep Kane Springs Canyon, where equipment had to be winched up the sheer walls, and the crossing of the Ord Mountains near Barstow.

Percussion drills pounded away for 5 weeks to prepare for the initial charge to blast a ditch through the pass of solid rock.

Blast Helps Fracture

New tool sets off a rocket-type propellant down hole to give fluid a pressure wallop needed on tough formations

LOS ANGELES.—A rocket-type fracturing tool has been developed to break up tough formations which usually resist ordinary fluid injection. Field tests show it can be of great help in this kind of work.

The new tool is called Frac-Assist by its developer, BJ Service, Inc., of Long Beach. It is a down-hole power package which generates its own high injection rates.

Source of the added fracturing force is a slow burning solid propellant that produces 5,000 hydraulic horsepower when ignited from the surface.

In many down-tubing fracturing jobs much of the observed surface pressure is deceiving because it is dissipated by friction inherent in pumping fluid thousands of feet below the surface. These losses don't occur when the power is generated down hole.

How it works . . . The tool is installed in the tubing string immediately above the perforation opposite the zone to be fractured.

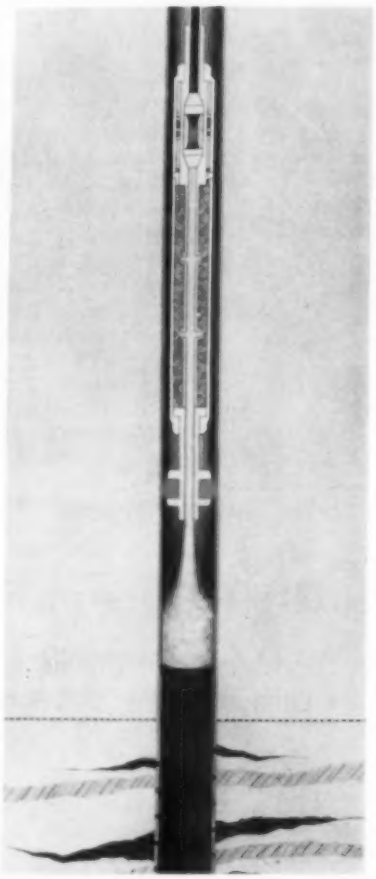
Normal fracturing procedures then are followed. Trucks pump fluid through the tool from the surface. After this hydraulic force has reached the zone, it is augmented by triggering the pressure-boosting tool.

The triggering is accomplished like this: A tubing plug is introduced into the fluid stream. When this plug enters the tool, it compresses a firing cam. This detonates blank cartridges which touch off the gas-generating propellant. An almost instantaneous downward surge is generated, and the fracturing fluid is forced from the hole, creating multiple, highly productive fractures.

These fractures are maintained and extended by the normal uninterrupted flow of fluid continuing behind the propellant-created surge.

Pressure generated in the tool will exceed the tubing pressure by 1,000 psi. When gas pressure inside the tool becomes 1,000 psi. greater than tubing pressure, ports open in the tool and vent the gas into the tubing. If the injection rate is greater than the formation can accept, pressure will rise until it breaks down the formation and forces it to accept fluid at the developed injection rate.

In field tests with the new device, pressure kicks reached 13,000 psi. at the surface after the tool was fired.



ROCKET PROPELLANT is set off in this tool. That generates gases for a pressure kick on the fracturing fluid. The extra force fractures unusually tough formations.

What tests show . . . Results obtained from Frac-Assist are shown in two of the field tests where it was demonstrated.

One was at a 4,773-ft. well in Wilmington field. Under earlier procedures no breakdown occurred when surface pressures reached 4,300 psi. while lease crude and sand were being pumped at a rate of 11 bbl. per minute.

Then the Frac-Assist was fired. A pressure rise of 1,300 psi. was noted at the surface. Following the formation breakdown, pumping pressure dropped from 4,300 to 3,600 psi. while fluid containing 1 lb. of sand per gallon was pumped at the rate of 12 bbl. per minute. After 95 bbl. of blended crude had been displaced, addition of sand was stopped. Pumping was continued until 140 bbl. more of lease crude had been displaced to complete the job.

Another test was made at a well in Chase-Silica field, Kansas. It previously had been fractured. When the tool was used on the second job, 9,000 gal. of thickened oil blended with 9,000 lb. of sand were displaced without an increase in pressure.

On the first job only 4,600 gal. of thickened oil blended with 4,600 lb. of sand could be put away. On the last 2,000 gal. of this the pressure had increased 2,000 psi.

The field tests conducted to date were on "incurable" wells. This meant that fracturing-pressure improvement could be measured but there was little chance for improving oil production.

Propellant used . . . The gas-generating fuel used in Frac-Assist is an ammonium nitrate blended with a rubber base matrix.

It is a variation of the solid rocket propellant used in many guided missiles.

The fuel is insensitive to shock. It burns with difficulty until a high-temperature ignition charge and confinement release the energy. Then it burns at a controlled rate to produce a large volume of gas. There is very little residue from the 50-lb. charge used.

Citronelle Studied

Drilling slowed, but Gulf denies development halted

MOBILE, Ala.—Gulf Oil Corp. has slowed drilling in Alabama's Citronelle field, but a spokesman denied rumors that the company is halting all development work there.

During the lull Gulf is making an intensive engineering study of the field, which set off Alabama's greatest oil boom less than 2 years ago. A month or longer is expected to be required to complete the survey.

Citronelle has been plagued by declining pressures in many wells. Gulf, principal operator, has discontinued production in recent months from the lower zone of many dual producers.

Discovered in August 1955, Citronelle is producing about 12,500 bbl. of crude daily. This represents a daily gain of some 5,000 bbl. in the past year. Several months ago Gulf completed a pipeline to transport Citronelle crude to dock facilities at Mobile Bay.

"We're still just as happy with Citronelle as we ever were," commented a Gulf spokesman in refuting rumors of a shutdown in drilling.

Union to Try Again

I.F.P.W. planning new drive for Middle East workers

THE INTERNATIONAL Federation of Petroleum Workers once again will attempt to organize oil workers in the Middle East.

Plans for a new campaign were made at the foderation's recent second world congress in Rome, Italy.

The I.F.P.W. also began negotiations there to merge with the World Secretariat of Chemical Workers, which includes 480,000 German chemical industry employes.

An earlier federation program to organize Middle East oil workers was halted by the Suez crisis.

The world organization of oil unions in 24 countries, representing 500,000 members, will establish regional offices in the Middle East to guide operations in such oil countries as Arabia, Kuwait, Bahrain, Iran and Iraq.

I.F.P.W.'s major organizational effort during the past 3 years has been in the Netherlands West Indies.

The federation, which maintains headquarters in Denver, signed up workers in two huge refineries—Shell on Curacao and Standard Oil Co. (N. J.) on Aruba. However, Standard has refused to recognize I.F.P.W. at Aruba, site of the world's largest refinery, and continues to bargain with Lago Employes Council, an organization which I.F.P.W. terms a company union.

The federation reported contract negotiations with Shell on Curacao are making good progress toward settlement. The federation, however, is threatening a strike at Aruba, where Standard Oil—according to I.F.P.W.—is ignoring a vote by 6,000 refinery workers favoring affiliation with the international union.

O. A. Knight, president of the U. S. Oil, Chemical and Atomic Workers International Union, was elected president of I.F.P.W. at the Rome congress.

36-Hour Week Is Target

WINDSOR, Ont.—Canadian district 16 of the Oil, Chemical and Atomic Workers International Union is going to strive for a 36-hour work week with no cut in take-home pay in next year's negotiations.

This goal was included in a petroleum committee resolution adopted unanimously at a recent convention of the district council here.

The council represents more than 11,000 Canadian oil workers.

watching WASHINGTON

. . . with Bertram F. Linz

Rehearsal for war . . .

FEW oil men noticed it, but for a time this month they were under the strictest of wartime controls.

It was all make-believe—part of "Operation Alert," 1957 version. But the purpose back of it was mighty serious—a dress rehearsal for what might be a real nightmare some day.

As in past years, the United States was assumed to have been hit by an atomic attack. This year's attack was a bad one. Half of the oil industry was erased or damaged in a number of industrial centers that were wiped out. About half of the population was dead, injured, or affected by radioactive fall-out.

With the warning signal, high government officials scattered to distant hideaways from which they directed suddenly needed war agencies. From these secret points came orders, previously prepared for just such an emergency, to restore industry and communications and mobilize all available manpower.

After the attack, the civil defense and wartime agencies quickly swung into action. A petroleum and gas administration put strict controls on oil and gas and issued super priorities for restoring bombed facilities. The whole economy was put on a wartime basis. But, fortunately, it was all on paper.

Scattergun attack on oil . . .

SENATOR O'MAHONEY'S report on his probe of the European oil lift will be a blanket indictment of the major companies—if he can get a majority of his subcommittee to approve it.

But there are signs that O'Mahoney won't win out without a bitter fight. Senator Dirksen of Illinois and several others in the group are bitterly opposed to some of the charges made by O'Mahoney.

The oil lift itself is only one of many subjects O'Mahoney wants to cover. He would also deal with last January's crude-price increase, Arabian American Oil Co.'s arrangements with the Saudi Arabian Government, the depletion allowance, the quick tax writeoffs given oil companies for new plant under the Government's industry-expansion program, oil company ownership of pipelines, and a number of other matters.

Most of these matters should be taken up by the Justice Department for further investigation, O'Mahoney believes.

Who's writing the laws?

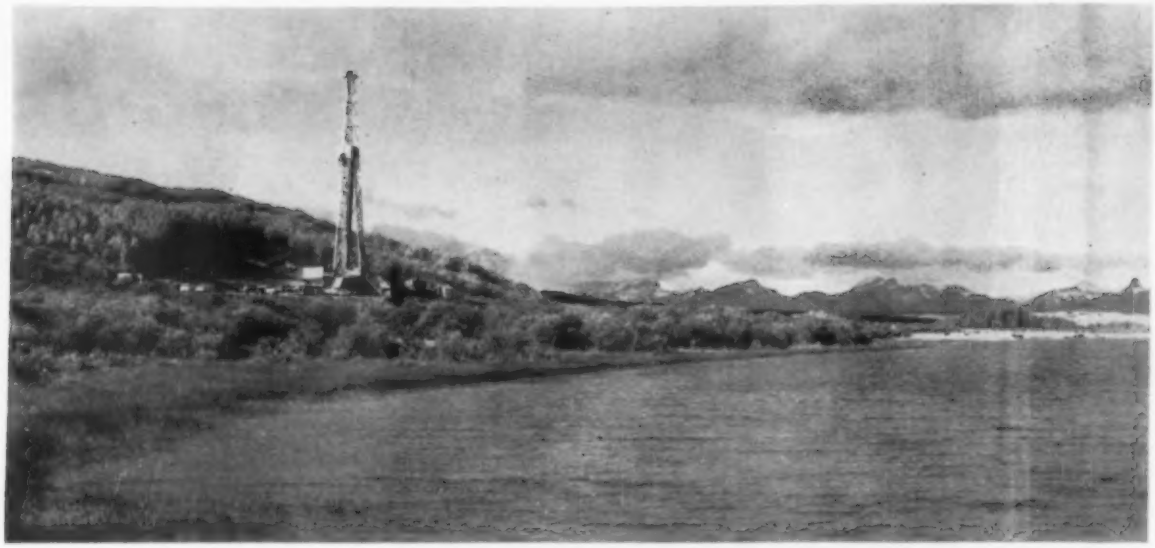
A SPECIAL House unit is planning to probe into the conduct of the Federal Power Commission and other regulatory agencies next winter. Right now, back of the scenes, a political hassle is going on over the line it shall take.

With an election coming up next year, House Republicans see the inquiry, which will be dominated by the Democratic majority, as a political move. But the Democrats point out that a number of the agencies have been the subject of much criticism, and from members of both parties.

The FPC has been attacked for the part it played in the handling of both the natural-gas bill and the Hells Canyon Dam. The Federal Trade Commission has been accused of being lax in following up on its own orders. There are 17 agencies all told, several of which are under fire.

The House commerce committee planned to inquire into the doings of the commissions but never got around to it. The special subcommittee will take over. Hearings will probably begin next winter. Right now Chairman Morgan M. Moulder of Missouri is setting up his staff.

Purpose of the study will be, put bluntly, to find out whether the regulatory agencies are writing law for themselves. In political terms that means to find out if the administration is calling the plays.



A higher or lower allowable for this Canadian well?

Alberta Ponders New Proration Ideas

ALBERTA'S Oil and Gas Conservation Board has a hot potato to handle. It's under pressure to revise the province's proration system.

The dispute centers on one basic factor of the proration formula: economic allowables. And there's a division of opinion among Alberta oil producers on its merits.

Most small companies and independents favor this system of assuring a well's payout. Others, including most of the major companies, would like to eliminate or at least reduce the economic allowables.

It's up to the board now to decide which way to go. A decision is expected next month. Board members have had the question under study for 2 months following a public hearing in May.

There have been no indications what the board decision will be. But most oil men believe economic allowables will be retained in some form.

The system . . . The disputed economic allowable is the amount of oil a well may produce without restriction.

It varies according to depth. Wells less than 2,700 ft. deep are allowed 35 bbl. daily. The scale then runs to 68 bbl. daily for 13,000-ft. wells.

These economic allowables are guaranteed. Their purpose is to make development drilling attractive. This is accomplished by giving the operator a chance to pay his well investment and operating costs.

If a well can't produce its economic allowable, it is classified as marginal. Production of the marginal wells is added to the sum of the economic allowables. This total is subtracted from the market demand. The balance, called "residual demand," is then divided among fields according to their potential.

That's just the beginning. The rest of the proration scheme would intrigue a Philadelphia lawyer. It involves such things as maximum permissible rates, potential adjustments, actual and theoretical potentials, allocation or proration factors, allowable adjustments, and working margins.

It sounds complex and it is. But the system has worked well. One company analyzed the plan from the beginning. It found "the average annual allocation factor has moved within a surprisingly narrow range."

This analysis described Alberta as an area "where long-term trends are not available and where pipeline facilities and markets are subject to somewhat erratic expansion." It concludes, therefore, that "any forecast of future allocation factors based solely on past trends would be most unwise."

Alberta undertook proration back in December, 1950. Its scheme has been basically unchanged since.

The case for it . . . Independent operators generally like the present proration system.

In fact, if there's any change, these men want the economic allowables increased, not eliminated. Some of their adjustment plans would:

. . . Keep allowables at present rate up to 5,000 ft. and increase them for greater depths.

. . . Reduce allowables 20 per cent for shallower wells and raise them almost 100 per cent for deeper wells.

Chief reason independents like the economic allowables is this: They help finance new operations.

With them, banks know how much oil a well will be allowed to produce. They can lend money on that knowledge. If all production were prorated on the basis of market demand alone and the number of wells, there would be much less certainty. And this would reduce the oil man's ability to get a loan.

The independents contend, too, that they do most of the wildcatting. This activity would decline, they say, if economic allowables are reduced. The reason is that there would be less incentive for exploration. The independents claim they do more than 50 per cent of the wildcatting yet get less than 25 per cent of the production revenue.

Another thing: Major companies tend to concentrate in the larger pools. The independents' biggest holdings, on the other hand, are in the smaller ones. One reason is that the majors can accumulate large blocks of acreage while the little fellows can't.

Western Decalta, one of the more vocal independents, says that a downward revision in economic allowables would:

. . . **Concentrate production** of the province in fewer and fewer hands.

. . . **Weaken the growing** independent industry.

. . . **Reduce exploratory** drilling.

. . . **Discourage development** of low-reserve, thin-pay pools.

. . . **Reduce bonuses** paid for Crown lands.

The other side . . . Critics of the economic allowables contend the present proration system has several faults. They say it tends to:

. . . **Encourage drilling** more wells than necessary.

. . . **Divert efforts** from developing new reserves.

. . . **Increase operating costs.**

. . . **Weaken the competitive** position of Alberta crude.

Imperial Oil, Ltd., is among these critics. It feels that the present system allocates too much of the market to economic-allowable wells.

Imperial sees another undesirable aspect. This is the wide difference in the rate of depletion for pools affected by proration. Under the system, wells with a low potential may get allowables equal to their potential. At the same time, wells with a high potential may get allowables equal to only one-third of their potential.

For its part Imperial would like to see:

. . . **Potential** made the primary consideration in proration.

. . . **Economic allowables** gradually reduced and eventually standardized.

. . . **Residual demand** allocated according to M.P.R.

Go-slow attitude . . . Imperial, however, would make any change gradually.

Its officials think the present base is too high. But since companies have made investments on that basis, they should be protected. Imperial recommends the present plan be kept until December 31, 1958.

Then a floor allowable of 35 bbl. per well could be set on January 1, 1959. Each year the basic allowable could be cut 5 bbl. until it was reduced to 20 bbl. per well on January 1, 1962.

Mobil Oil Co. of Canada agrees that the applecart should not be suddenly upset. It proposes keeping the present system 5 years. Then it would institute a 6-year "investment economic allowable" to be followed by a permanent "operating economic allowable." The first would closely parallel the present economic allowable. The 6-year period would begin when a field was 50 per cent drilled.

Mobil also urges that recognition be given to the wellhead price to compensate for lower value crude or for crude faced with a transportation penalty. This, it holds, is not properly recognized today. Mobil would like to include injection wells, observation wells and wells suspended in unitized fields when the "investment economic allowable" is calculated.

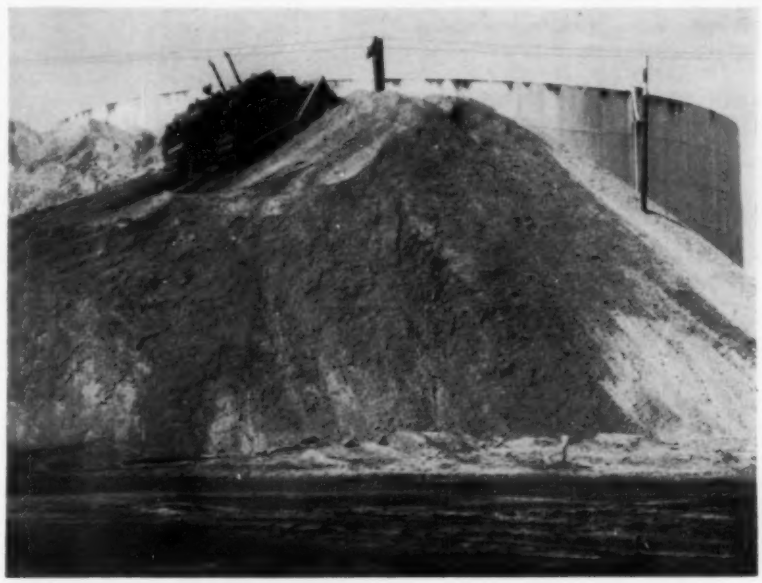
Production drops . . . The proration discussion comes at a time when Alberta production is dropping sharply.

August nominations by purchasers of Alberta crude showed nearly a 40,000-bbl. daily drop from July. Refiners applied for only 381,166 bbl. daily for August compared with 420,494 bbl. in July.

Three U. S. refiners who usually nominate withdrew from the market for August. They are Bay Refining Corp., Bay City, Mich.; Phillips Petroleum Co., Great Falls, Mont.; and West Branch Refineries, West Branch, Mich.

August nominations were the smallest since June 1956 when a strike at Shell Oil Co.'s Anacortes, Wash., refinery eliminated that company's nomination.

Of the 110,972 bbl. daily nominated by U. S. refiners, 95,811 bbl. will move through Trans-Mountain pipeline to the Northwest and 15,161 bbl. will move through Interprovincial to the U. S. Midwest.



King-Size Sandpile Helps Erect Tanks

BAYONNE, N. J.—Esso Standard Oil Co. engineers have stolen a page from the highway engineers' notebook.

When the New Jersey turnpike was built through swampy areas, the engineers loaded the right-of-way with mounds of fill. After the land settled, they built the turnpike across it.

Esso is using the same method to prepare soft ground on its refinery site where it will install three 150,000-bbl. storage tanks for Bunker C fuel oil. The mounds will be left in place 10 months and removed next spring, just before construction starts.

The heavy loads are expected to compress the ground so that the normal procedure of sinking pilings can be bypassed. Esso brought in 50,000 cu. yd. of sand to preload two of the sites. Chrome ore is used at the other. Two other tanks are going in on solid ground where preloading won't be necessary.

The fill was dumped on settlement platforms—6-ft. diameter steel plates. Each plate has a 20-ft. striped pole welded to it so the amount of settlement can be measured at each location.

Mountain Honors Pioneers

CASPER, Wyo. — A 12,600-ft. Wyoming mountain has been named "Petroleum Peak" in memory of the West's oil-industry pioneers.

The peak, in the Wind River Mountains near the top of the Continental Divide, was "claimed" for the oil industry by seven mountain climbers from Casper Junior College and Andy Anderson, manager of the 1957 Rocky Mountain Oil Show slated for Casper September 19-21.

The peak is a timeless memorial to the men who founded the West's oil industry 74 years ago.

Harris Bill Is Delayed

Rules committee bogs down, Rayburn postpones decision; bitter fight expected when issue goes to House for vote

WASHINGTON.—The Harris gas bill will face a major test when it is brought up on the House floor for debate, possibly next week.

This became clear when House Speaker Sam Rayburn said he had dropped a plan to bring the bill up for vote this week.

The original plan was to have the House rules committee send the bill along for a showdown on the House floor. But toward the end of last week the committee was bogged down with a number of witnesses urging it not to approve the measure.

The committee, although reportedly standing evenly divided on the bill, is expected to send the measure to the floor. While a split vote could prevent that, some of the members opposed to the bill say they don't want to be responsible for denying the House a chance to pass on it. They will vote to bring the bill out and then oppose it on the floor.

The delaying of House action by Rayburn is seen as evidence that the bill is in deep trouble again. Rayburn said he has not taken a poll, but a number of members have announced they will fight the bill.

One of the major charges opponents will make is that the lack of supply, which the Harris-Fulbright bill was aimed at preventing 2 years ago, has not developed. They say there is ample gas available, and no incentive is needed to bring out more.

Issues in doubt . . . The gas industry saw a preview last week in the House commerce committee of the fight expected on the House floor.

The main fight will occur between supporters of the bill and the consumer groups. But the report of the House commerce committee shows plainly that the issue is not black and white. There are shades of opinion.

The 15-man majority that voted the bill out of committee will base its case on the contention that the bill will produce a greater supply of gas for consumers without weakening their protection.

The 13-member committee minority is prepared to charge that the bill will cost consumers a billion dollars a year, unjustly enrich a "few large oil companies which own 90 per cent of the natural gas production," and provide a "multi-billion-dollar windfall" to a few pipeline companies which own gas reserves.

Two other members, Reps. John Williams of Mississippi and Bruce Alger of Texas, did not vote on the bill in committee but will support it on the floor. Their position is that the bill still allows too much federal regulation.

Williams and Alger contend that the industry is highly competitive, and there is no need to protect the consumer with federal controls. Competition, not regulation, provides the most effective protection.

Changes sought . . . Rep. Harley Staggers of West Virginia said he isn't satisfied with the minority report, although he signed it. If he can get two amendments approved, he may vote for the bill. The amendments give the Federal Power Commission control of direct sales and authority to bar below-cost sales by pipelines.

The majority report cites two reasons why the bill should become law. First, the Supreme Court, in the Phillips case, brought "thousands of producers who do not have the characteristics of public utilities" under the same type of control imposed on pipeline companies. Second, the court decision laid "an enormous burden" on the FPC.

The report said the bill would correct this by providing "reasonable market price" regulation.

To answer charges that consumers will suffer, the majority said: "In providing for this method of regulating producer sales, numerous safeguards are included to protect consumers not only in their long-term interest in plentiful supplies of gas but also in their right to fair prices."

"Dangerous departure" . . . Williams and Alger are sympathetic with the gas industry's effort to escape strict federal control. But they object to the Harris bill because it approves "legislation enacted by the Supreme Court, superseding and overriding previous laws enacted by Congress."

"We look upon this (Phillips) decision as a dangerous departure from the basic principles supporting the dual sovereignty form of government and a policy which, in the hands of some irresponsible court, might serve in the future as the instrument to be used in the dissolution of state lines and the concentration of governmental powers in the federal government," they said.

"We recognize the proven fact that the key to totalitarianism and its attending loss of individual freedoms and rights is to be found in the over-concentration of powers in the central government.

"We cannot, in good conscience, advocate the philosophy of legislation which, in our opinion, would create a serious jeopardy to free enterprise, give additional impetus to centralization of government, and constitute flagrant invasion of states rights."

Washington Well Cements Casing

SEATTLE.—Operators at Washington's closely watched wildcat last week halted drilling at 4,130 ft. and ran 5½-in. casing.

The plug will be drilled early this week. Officials reported, however, additional information will not be released until the well is completed.

The wildcat is the 1 Madina of Sunshine Mining Co. and J. W. Tanner. A Sunshine geologist earlier reported the well flowed at a rate of 400 bbl. daily of 48°-gravity oil on a drill-stem test (OGJ, July 22, p. 56). Production was from the Nye (Lower Miocene) at 3,940-63 ft.

Since then several different types of logs have been run and further tests made.

The well is in Grays Harbor County and in an area previously explored. It is a northerly offset to Union Oil Co.'s Hawksworth test and northwest offset to Union 3 State. Both of these wells showed as producers for a while but were later abandoned.

Kuykendall Approved

WASHINGTON. — Nomination of Jerome K. Kuykendall for another 5-year term on the Federal Power Commission was approved last week by the Senate commerce committee.

The vote was not disclosed, but Chairman Warren G. Magnuson of Washington said the committee was sharply divided.

Kuykendall, who has been off the FPC since June 22, when his term expired, still faces a stiff fight for confirmation on the Senate floor.

Major charges against Kuykendall stem from the commission's stand on public power and his activities in connection with a bill to release independent gas producers from federal control.

Flood Expanding

Sinclair expects to add 2 million barrels of oil

BIG SPRING, Tex.—Sinclair Oil & Gas Co. plans to expand a pilot water flood it has operated for the past 3 years on its 1,125-acre Dodge Estate lease in Iatan-East Howard field of Howard County, West Texas.

The company now is injecting water into the 2,500-ft. San Angelo-Clearfork pay through nine input wells on a portion of the lease in Section 11, Block 30.

It has 56 producing oil wells on this 645-acre part of the lease and 46 producers on the 480-acre portion in Section 3.

The company plans to convert 15 more producing wells in Section 11 to input service and drill two more inputs.

A Sinclair spokesman, John Estill, told the Texas Railroad Commission that response to water injection in the pilot had been good since December of last year. He said production of wells near the inputs had increased about 200 bbl. a day since then.

Production in the project area is in the final stage of primary depletion, Estill said. The first well on the Dodge Estate lease was completed in September 1930. Production has declined now to about 5.2 bbl. per well per day.

The lease had produced a total of 5,973,985 bbl. to June 1, 1957. Sinclair estimates original oil in place at 44,088,000 bbl. It thinks the flood will recover an added 2,024,000 bbl. of oil.

Offshore Problems Studied

WASHINGTON. — Problems involved in the administration of the Continental Shelf oil lands have been taken up for study by a new House judiciary subcommittee headed by Rep. Edwin E. Willis of Louisiana.

The group already has met with Interior and Justice officials. It plans to hold hearings shortly to get the views of those officials and industry men on record.

Operators going offshore have found new problems involving leases and regulations which put them under navigation and other laws they are not subject to on land. But the Government also has some problems that must be solved.

Subjects already outlined for study, therefore, include the proper development of offshore oil reserves, conservation, workmen's compensation insurance and, legal problems created by leases.

Pipeline briefs

Magnolia Petroleum Co. will start this week on a looping program to increase the capacity of its Midland-to-Beaumont crude line by 75,000 bbl. per day. H. B. Zachry Co. will start laying 24 miles of 20-in., 83 miles of 16-in., and 20 miles of 12-in. between Clyde and Corsicana, Tex. The contractor expects to complete by November 1.

The second phase of the project will start September 15. O. R. Burden Construction Corp. won the award for this section. It includes 120 miles of 16-in. and 4 miles of 12-in. between Midland and Clyde. Completion date is December 31.

Transcontinental Gas Pipe Line Corp. is due to wind up its 28.5-mile, 16-in. offshore line this week. Sharman, Allen, Gay & Taylor, Inc., laid the line from the Louisiana coast to West Cameron Block 45.

Capacity will be 110,000,000 cu. ft. daily, although initial throughput will be less than one-third this volume. Transco will pay 16 cents per M.c.f. initially for gas from Block 45 field, which has reserves estimated at 88 billion cubic feet.

Texas Gas Transmission Corp. will recondition 20 miles of 18-in. gas line from Guthrie station in Louisiana eastward. Houston Contracting Co. will do the job. Work will begin September 1, and completion is scheduled in 45 days.

Michigan Wisconsin Pipe Line Co. is adding 46 miles of 24-in. loop to its main line in Wisconsin. G. E. T. Construction, Inc., has the contract. The project will wind up September 1. Michigan Wisconsin is laying 21 miles of 4, 6, and 12-in. laterals for completion at the same time.

American Louisiana Pipe Line Co. will complete purchase laterals this week linking the system with additional reserves in Louisiana. Ford, Bacon & Davis, Inc., had the contract for the 5 miles of 16-in. from Cameron meter station to Second Bayou field and 6 miles of 12-in. from the field to the meter station at Holly Beach.

Cities Service Gas Co. has replaced an old 16-in. line from Verden, Okla., to the Canadian River with 34 miles of new 16-in. pipe. Brodie Construction Co. finished the job this month. Two other system improvements will be completed during the next 6 weeks. They include replacement of 6.6 miles of 16 and 18-in. line with 30-in. from Merriam, Kans., to Kansas City, Kans., and replacement of two 16-in. lines with 15 miles of 26-in. from Gardner, Kans., to Merriam. Both jobs were contracted to Prairie Construction Co., Inc.

Great Lakes Pipe Line Co. has awarded another major contract in its 1957 expansion program. Laco Pipeline Contractors, Inc., was awarded 137 miles of 8-in. from Minneapolis to Duluth. It will be built in two sections. The contractor plans to start September 1. This extension will permit Great Lakes to serve a new market.

El Paso Natural Gas Co. will start construction this week on pipeline projects in Arizona and the Texas Panhandle. Both are contracted to R. H. Fulton & Co.

Fulton is moving a spread from California to lay 27 miles of 34-in. near Winslow, Ariz. This was added to a contract which was finished earlier. The other project is 81 miles of 18-in. and 13 miles of 20-in. from El Paso's Panoma plant in Gray County, to the Dumas plant, in Moore County.

Shamrock Oil & Gas Corp. has completed a 32-mile, 6-in. crude gathering line and 15 miles of field feeders in Ochiltree and Hansford counties in the Texas Panhandle. The line has a capacity of 10,000 bbl. a day. It will feed into Shamrock's McKee refinery in Moore County. The gathering system was built by Emerald Pipe Line Corp. of Amarillo, in which Shamrock owns a minority interest.

Also for Pipeliners . . .

Lower freight rates are ordered by ICC for oil-field pipe (p. 107) . . . Contract has been let for Cosden's 128-mile, 6-in. products line from near Abilene to Wichita Falls, Tex. (p. 109) . . . Natural-gas industry can expect a rapidly growing and long-time future prosperity (p. 110) . . . Federal Government has filed suit to break up El Paso Natural-Pacific Northwest merger (p. 112) . . . Topock-to-Newhall line finished, giving Southern California big jump in gas supplies (p. 113) . . . Barge operators are opposing conversion of Little Inch (p. 121) . . . Pipeline construction heads for a record year (p. 180).

Rubber Outlook Bright

Demand for synthetics continues to outstrip production, promises growing market for petroleum-derived feed stock

WASHINGTON.—Synthetic - rubber capacity will jump more than 20 per cent in the United States this year.

Even with this sharp increase, it appears that demand will still outstrip production in 1957. And that means a growing need for L.P.G. and other petroleum-derived ingredients.

Synthetics now meet about 60 per cent of this country's rubber needs. The industry's economists predict that within another 5 years the ratio of synthetic to natural will be closer to 70-30.

The improvement in the position of synthetics has come about in spite of the fact that the automobile industry has not lived up to expectations.

Normally it takes 60 per cent of the output. But dependence on this market is lessening.

Last year synthetic-rubber manufacturers produced 1,079,874 long tons, according to the attorney general's report on competition in the synthetic-rubber industry. This was made up of 81 per cent GR-S, 9 per cent neoprene, 7 per cent butyl, and 3 per cent N-type.

Prices, growth prospects . . . The decline in rubber consumption in the U. S. last year hit natural harder than synthetic.

Total demand dropped 6 per cent, but synthetic was off only 2.3 per cent. Then came the Suez crisis and with it a skyrocketing boost in natural rubber prices. Natural recently has been quoted at 32⅞ cents, compared with 23½ for synthetic.

Thus, with a favorable price position and a growing demand, the synthetic-rubber industry promises to grow both bigger and stronger. In doing so, it will put most of its emphasis on GR-S, a product of the copolymerization of styrene and butadiene.

Production capacity of GR-S at the end of 1956 was 1,098,000 long tons. This compares with 889,100 tons at the end of 1955. By the end of this year capacity is expected to reach 1,377,500 tons. This would be a 55 per cent increase in the 2 years since private industry took over from the Government.

Plant expansions . . . Principal developments scheduled this year in the GR-S field are:

. . . A 40,000-ton increase in the capacity by Firestone Tire & Rubber Co. at Lake Charles, La., and Akron, Ohio.

. . . An 80,500 - ton increase by Goodyear Rubber Corp., at Houston and Akron.

. . . A 58,000-ton increase by Phillips Chemical Co. at Borger, Tex.

This year also marks the entrance

GR-S—CAPACITY, PRODUCTION, SALES*

Company—	Dec. 31, 1955 Capacity (long tons)	Per cent of cap.	Per cent of prod.	Per cent of sales	Dec. 31, 1956 Capacity (long tons)	Per cent of cap.	Per cent of prod.	Per cent of sales	Dec. 31, 1957 Capacity (long tons)	Per cent of cap.
American Synthetic Rubber Corp.	50,000	5.6	6.6	5.3	43,500	4.0	4.4	4.5	68,500	5.0
Copolymer Rubber & Chemical Corp.	57,000	6.4	6.4	5.6	60,000	5.5	6.8	6.8	75,000	5.4
Firestone Tire & Rubber Co.	150,000	16.8	19.1	19.9	190,000	17.3	20.6	18.1	230,000	16.7
General Rubber Synthetics Co.									40,000	2.9
Goodrich-Gulf Chemicals, Inc.	110,000	12.4	12.7	10.3	232,000	21.1	12.9	11.5	242,000	17.6
Goodyear Synthetic Rubber Corp.	160,500	18.1	17.7	23.0	160,500	14.6	18.4	16.6	241,000	17.5
Phillips Chemical Co.	69,400	7.8	7.1	8.0	72,000	6.5	6.9	9.7	130,000	9.4
Shell Chemical Co.	102,000	11.5	10.2	10.6	126,000	11.5	9.6	10.0	126,000	9.2
Texas-U. S. Chemical Co.	106,000	11.9	12.0	10.4	127,000	11.6	12.8	12.5	127,000	9.2
United States Rubber Co.	22,200	2.5	2.6	1.9	25,000	2.3	2.7	2.7	30,000	2.2
United Rubber & Chemical Co.	62,000	7.0	3.7	5.0	62,000	5.6	4.9	7.6	68,000	4.9
Other			1.9							
Total	889,100	100.0	100.0	100.0	1,098,000	100.0	100.0	100.0	1,377,500	100.0

*Data supplied Department of Justice by producers.

BUTADIENE—CAPACITY, PRODUCTION, SALES*

Company—	Dec. 31, 1955 Capacity (short tons)	Per cent of cap.	Per cent of prod.	Per cent of sales	Dec. 31, 1956 Capacity (short tons)	Per cent of cap.	Per cent of prod.	Per cent of sales	Dec. 31, 1957 Capacity (short tons)	Per cent of cap.
Copolymer Rub. & Chem. Corp.	23,000	3.4	4.8	4.8	30,000	4.0	4.3	5.0	30,000	2.8
Dow Chemical Co.	12,500	1.8	1.1	1.1	12,500	1.7	1.7	1.5	17,400	1.6
Esso Standard Oil Co.	37,500	5.5	4.7	4.6	40,000	5.3	4.8	4.3	50,000	4.7
Firestone Tire & Rubber Co.									40,000	3.8
Goodrich-Gulf Chemicals Co.	105,000	15.6	16.2	15.9	110,000	14.7	15.3	14.7	110,000	10.3
Humble Oil & Refining Co.	49,000	7.3	7.2	9.7	49,000	6.5	6.9	6.4	65,000	6.1
Odessa Butadiene Co.									50,000	4.7
Petroleum Chemicals, Inc.	65,000	9.6	11.4	11.2	70,000	9.4	9.7	9.6	80,000	7.5
Petro-Tex Chemical Corp.	100,000	14.8	15.0	14.7	115,000	15.4	15.1	15.2	200,000	18.8
Phillips Chemical Co.	74,000	11.0	12.1	11.4	91,000	12.1	11.5	11.0	112,000	10.5
Shell Chemical Corp.	60,000	8.9	7.7	7.5	70,000	9.4	6.8	6.8	70,000	6.6
Standard Oil Co. of California	14,000	2.1	2.3	2.3	16,000	2.1	2.2	4.3	16,000	1.5
Texas Butadiene & Chem. Co.									80,000	7.5
Texas-U. S. Chemical Co.	108,000	15.6	15.2	14.6	110,000	14.7	14.9	14.6	110,000	10.3
Union Carbide & Carbon Corp.	30,000	4.4	1.1	1.1	35,000	4.7	4.6	4.5	35,000	3.3
Publicker Industries, Inc.			1.2	1.1			2.2	2.1		
Total	675,000	100.0	100.0	100.0	748,500	100.0	100.0	100.0	1,065,400	100.0

*Data supplied Department of Justice by producers.

of a newcomer in GR-S — General Rubber Synthetics Corp. Its new plant at Odessa, Tex., will add 40,000 tons to the nation's capacity.

Butadiene, butyl rubber . . . Three new butadiene suppliers will enter the picture this year.

They are Firestone, Odessa Butadiene Co., and Texas Butadiene & Chemical Corp. They are expected to account for 16 per cent of the total supply by the end of the year.

In addition, Petro-Tex Chemical Corp. will almost double the capacity of its Houston plant.

At the end of 1956, Esso Standard Oil Co. at Baton Rouge and Humble Oil & Refining Co. at Baytown were the lone producers of butyl rubber. Consumption dropped from 71,973 long tons in 1954 to 39,555 tons in 1956, largely as a result of the introduction of the tubeless tire. But this trend will be reversed.

Petroleum Chemicals, Inc., next year will complete a 30,000-ton butyl-rubber plant at Lake Charles, the first of its type since World War II.

Line Conversion Hit

Brief charges Little Inch might become private line

WASHINGTON.—Mississippi River barge operators stepped up their fight against conversion of the Little Inch pipeline from gas to products last week.

They filed a charge with the Federal Power Commission that Texas Eastern Transmission Corp. is reportedly planning to get into oil refining and production.

They claim such a step would nullify the company's assurance to the FPC that the Little Inch would be operated as a "true common carrier for hire" and not as a shipper-owner line.

The barge interests filed with their brief a copy of a report in the July 15 issue of The Oil and Gas Journal of Texas Eastern's proposal to acquire a minimum of 81 per cent of the stock of La Gloria Oil & Gas Co. La Gloria owns a modern refinery at Tyler, Tex., with a capacity of 25,000 bbl. daily.

The brief charged that negotiations with La Gloria were going on even while the application for conversion of the Little Inch was before the FPC.

They asked that the FPC call on Texas Eastern officials to explain the company's revision of its previously stated plan. Meanwhile, they said, the order approving conversion should be vacated.

Processing briefs

Two Esso Standard Oil Co. refineries have new records to shoot at. The Baton Rouge, La., plant completed tournaround of No. 10 pipe still in 4 working days for the first general inspection of the 80,000-bbl. unit.

The other record was for safety—218 consecutive days without a disabling injury at Bayonne, N. J. The previous Bayonne record of 217 days, set in 1954, earned the refinery a National Safety Council award.

Phillips Petroleum Co. employes have gone a full year without a lost-time injury at the company's 19,000-bbl. Okmulgee, Okla., refinery. It was the sixth time since 1948. Once during that period the plant operated 2 consecutive years without a disabling injury.

The recent increase of 0.2 cent a gallon in the tank-wagon price of gasoline has been canceled in most of Texas. A 0.2-cent reduction was announced by Continental Oil Co., The Texas Co., Gulf Oil Corp., and Shell Oil Co. The move erased recent price increases prompted by higher labor costs.

Shell's price adjustment covered the whole state, while the other three companies exempted the area west of the Pecos River. Conoco's reduction also was effective for kerosine and diesel fuel.

Shell Oil Co. has awarded a contract to Procon, Inc., for design, procurement, and erection of a combination Universal Oil Products Co. Platforming-Unifining unit at its Norco., La., refinery. Capacity will be 16,000 bbl. per stream day. The unit, one of the largest of its type, will be finished in 1958. The Platformer will be designed for high-severity operation.

Cascade Natural Gas Corp. has signed a 5-year agreement to supply natural gas as fuel for Shell Oil Co.'s Anacortes, Wash., refinery. Initial delivery will be 1.8 billion cubic feet per year. Eventually this will increase to 2.1 billion. Cascade's line passes near the refinery on its way to the city of Anacortes.

Humble Oil & Refining Co. has let contract for expansion of its Houston research center at a cost of about $3,000,000. The project will include construction of a fourth floor on the major portion of the main building and the addition of four-story wings on each end. It will add about 65,000 sq. ft. of floor space.

Sinclair Refining Co.'s new tanker, SS J. E. Dyer, has delivered on her maiden voyage the largest single cargo of heating oil ever received at New York Harbor.

The cargo, which arrived last week, consisted of 241,310 bbl. of heating oil from Sinclair's Houston refinery to the company's storage terminal at Tremley Point, N. J., on Arthur Kill. The 32,900-ton tanker, named for the Sinclair president, was launched at the Bethlehem-Sparrows Point shipyard April 30.

Procon, Inc., has been awarded the engineering and construction contract for a new unit at the Phillips Petroleum Co. refinery at Woods Cross, Utah. Procon will build a Universal Oil Products Platforming unit with a capacity of 3,700 bbl. per stream day.

Construction will start this fall and be completed next spring. Also included in the contract are a prefractionator and offsite facilities.

Also for Refiners . . .

L.P.G. stocks reach new all-time high, but new demand patterns and expanded underground storage may allow industry to ride out the trouble (p 105) . . . Gulf is entering benzene production with new unit at its Port Arthur plant (p. 107) . . . Demand for synthetic rubber continues to outstrip production, which is due a 20 per cent jump this year (p. 120) . . . An English jurist has ruled in a tanker case that butanized crude is legally crude oil (p. 124) . . . Shell and British Petroleum are halting marketing operations in Israel. A site at Portobelo Harbor has been picked for Panama's new refinery (p. 125) . . . Four marketing firms will submit joint proposal to build first major refinery in West Pakistan (p. 126).

PLUS THESE TECHNICAL FEATURES: Texaco process for producing hydrogen has been proved successful in commercial operation (p. 203) . . . Sinclair uses air heater as part of program cutting its fuel costs per barrel by 25 per cent (p. 205).

In Fullerton Clearfork unit . . .

Firms Find a Way to Admit New Wells

HOBBS, N. M.—Members of the big Fullerton Clearfork Unit have come up with one answer to a problem that has plagued unitized operations for years: How to take new acreage into the unit.

The Fullerton unit is located in Andrews County, Texas, just a few miles east of here.

Participants now have a simple and logical formula for admitting acreage. It is believed fair both to owners of acreage already unitized and to owners of incoming acreage.

Upshot is that the Fullerton Unit has avoided arguments and deadlocks that have made it impossible for many other units to add acreage.

The formula . . . Under the Fullerton method, new acreage participates in the unit on the basis of actual primary oil reserve of the new area.

The idea is simple: Assume incoming acreage will decline at the same rate as the rest of the field.

Mechanics of the plan run like this:

Present bottom-hole pressure of the incoming well is measured to establish its stage of depletion.

This pressure is placed on the decline curve for the entire field.

Then, the percentage of in-place oil which the field should recover from this pressure to abandonment is determined.

The new well is given credit for recovering this same percentage.

This procedure fixes future primary oil recovery of the well. The new well participates on the ratio of its oil reserve to the total primary oil reserve of the unit.

The wells involved . . . Wells now being added to the Fullerton unit are on the west edge of the field.

These wells mostly would not produce without being fractured. The formation generally is hard and tight. Oil recovery per acre would be lower than for wells in the middle of the field.

Unit members did not consider it fair to take in edge wells on the same formula used when the field was first unitized. This old formula was based on two factors. One was allowable production through the base year 1950. Second was a combination of 1950 bottom-hole pressure, surface acreage, and gross thickness of pay.

Thus, the old formula took no account of oil reserve. It actually would have favored most of the new edge wells. Even with a low reserve, they might come into the unit on the same basis as high-reserve wells in the middle of the field.

In the past many units have deadlocked over this point. The result was that new acreage stayed out, and all concerned lost. Fortunately some 6 months ago the engineering committee of the Fullerton unit proposed its new formula based on actual reserves.

Since that time several edge-well owners have accepted the new formula. The first wells are now being officially brought into the unit.

How to figure reserves . . . The unit engineering committee first figured original oil in place for all acreage in the unit.

The estimated original oil in place was based upon material-balance calculations employing reservoir-pressure and production data for the period of 1944 to 1956. Other data came from core samples taken by the companies before unitization and information collected by the unit operator, Monterey Oil Co., since the unit started.

From this information the committee predicted the decline curve shown in the attached graph. This compares bottom-hole pressure to cumulative production as a per cent of the original oil in place.

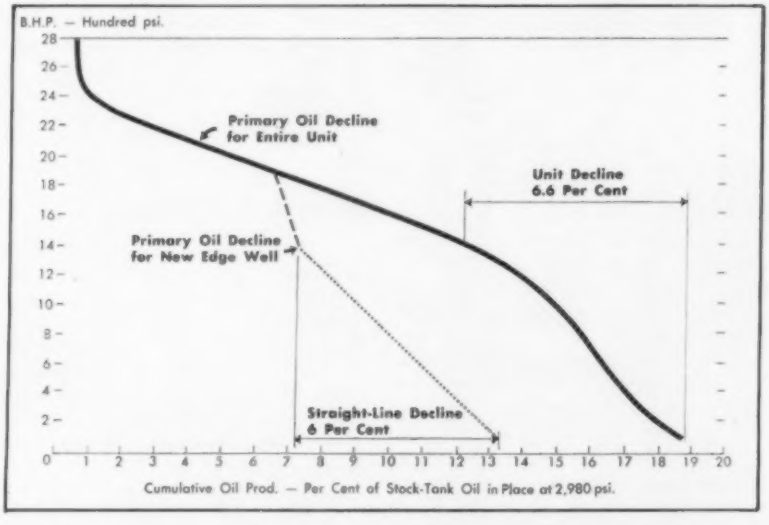
The in-place oil then was figured for each well to be brought into the unit. This was done by the engineering committee from radioactivity logs. A decline curve next was plotted for each well similar to the decline of the unit.

The edge well shown on the accompanying graph is considered typical. When its bottom-hole pressure at completion was put on the unit's decline curve, the edge well declined faster than the unit. The dotted line is a straight-line prediction of the new well's performance. Notice that this method gives the well another 6 per cent of its in-place oil than it could recover.

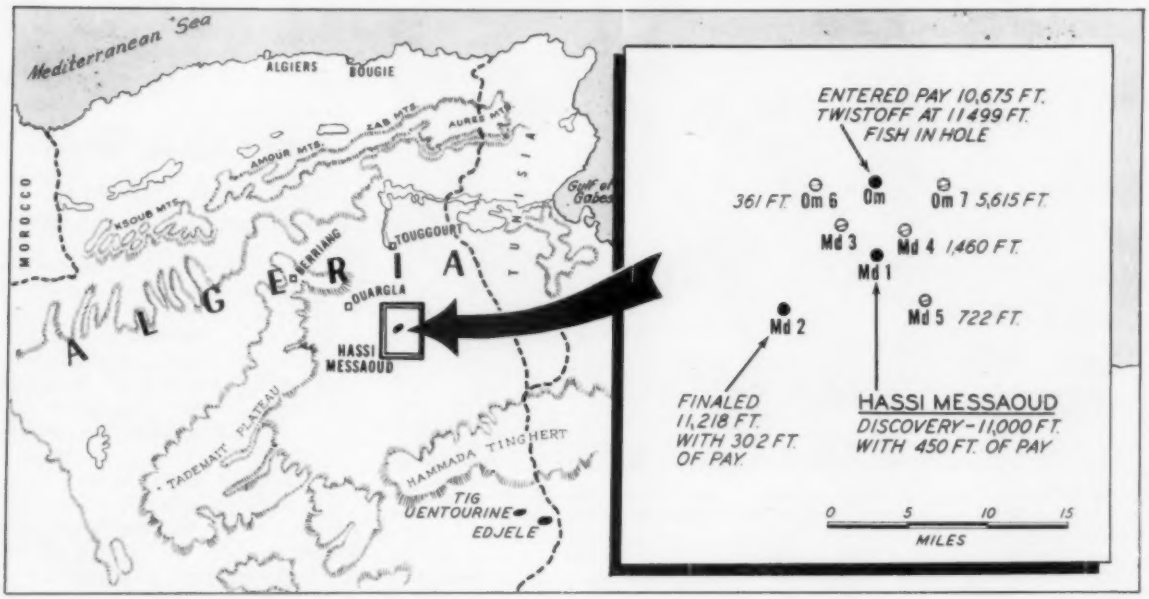
Actually the straight line probably is more drastic than the real decline of the well would be. Figuring from the same pressure to depletion, future recovery of the unit itself would total 6.6 per cent of oil in place.

Engineers thus decided that the straight-line extrapolation for the new well probably was too drastic and the unit curve probably was too optimistic. An arbitrary split of the difference was made, giving the new well credit for being able to recover 6.3 per cent of the oil in place.

This recovery percentage was converted to stock-tank barrels. The well's participation in the unit was on the basis of the ratio between its primary reserves and the unit's primary reserves as of the same date.



FORMULA for new wells entering Fullerton Clearfork unit is based on decline curves on oil in place for the entire unit and the new well. New well's share of unit production is compromise between its primary-oil decline and that for the unit.



Billion-dollar price tag is attached, but . . .

. . . Sahara Offers French Oil Freedom

POLITICIANS last week looked fondly at the sandy wastes of the Sahara Desert and talked of French oil independence in 3 years—if France is willing to spend more than a billion dollars.

At the same time French oil men in North Africa talked of shipping more than 4,000 bbl. daily of Sahara oil to the Mediterranean by the end of the year. They say "conservatively" they have found 700,000,000 bbl. of crude. This is at Hassi Messaoud, the deep field, alone. No one has ventured even a preliminary estimate of the shallow Edjele field.

The two French companies, both of them government-controlled, which are developing the deep find in the east-central Sahara now have three productive wells. Four more are drilling on what the French hope will be the same structure.

Here is the latest information on those wells:

. . . **Hassi Messaoud 1** (Md-1) started it all late last year when the well found a 450-ft. sandstone pay at 11,500 ft. about 60 miles southeast of Ouargla. The French say this well will yield from 1,800 to 2,500 bbl. daily of high-gravity, sulfur-free crude (OGJ, Dec. 31, 1956, p. 104, and Feb. 18, p. 118).

. . . **Om 1,** drilled 4.8 miles due north of the discovery, entered the same pay updip at 10,675 ft. Last week crews were fishing in the hole after a twistoff at 11,499 ft. The French say at that depth they are still in the same sand.

. . . **Hassi Messaoud 2** (Md-2), 6.6 miles west-southwest of the discovery, was below 11,220 ft. last week and had already drilled through 320 ft. of the sand. A July 7 test of this well, the French say, proved it to be in the same class as the discovery.

. . . **Hassi Messaoud 3** (Md-3), 2.7 miles northwest of the discovery, was being ignored in all comments last week. Two months ago this was drilling below 8,000 ft.

. . . **Hassi Messaoud 4,** (Md-4), was drilling below 1,460 ft. at a location 2.4 miles northeast of the discovery.

. . . **Hassi Messaoud 5,** (Md-5), was spudded 3.9 miles to the southeast of the first well and surface casing had been set to 722 ft.

To the north, east and west stepouts are being drilled to Om 1. They are:

. . . **Om 7** drilling below 5,615 ft. at a location 4.2 miles east of Om 1.

. . . **Om 6** has been spudded 3.6 miles due west of Om 1 and surface casing set at 361 ft.

These wells are all being drilled jointly by Soc. Nationale de Recherche et d'Exploitation des Petroles en Algeria (SN Repal) and Cie. Francaise Petrole (Algerie). The two companies pooled their equipment and operations on adjoining exploration licenses after SN Repal brought in the discovery.

Berriane, Ghardaia activity . . . About 120 miles to the northwest of all this Hassi Messaoud activity, SN Repal has moved in a second rig borrowed from Soc. Languedocienne de Forages Petroliers (S.L.F.P.) to test a Triassic dolomite section which the company believes is productive.

Drilling was suspended on Hassi R'Mel 1 on the Berriane license when the rig had trouble after encountering high-pressure gas with a small amount of condensate from 6,993 to 7,301 ft.

To the west-southwest 8.4 miles, Hassi R'Mel 2 has been bottomed in the Ordovician at 7,570 ft. after finding 157 ft. of the same Triassic section between 7,282 and 7,439 ft. SN Repal says tests of the section show the same "characteristics and potential for productivity" as Hassi R'Mel 1.

The new borrowed rig is spudding a Hassi R'Mel well 10.2 miles to the northwest of the first test.

Farther to the north on the same Berriane license, the company is preparing to test Guerrara 1 which last

EXPLORATION WELL in Sahara Desert, 13 miles from Timimoun, shows intensive search for Algerian oil. Air-conditioned accommodations for workers are in background.

week was drilling below 11,110 ft. The bit was still in a Triassic sand section which it encountered at 10,712 ft. The company said it has had several shows in the section. The companies have two other tests under way farther to the north. They are:

... Bordj Nili 1, in the northwest corner of the Berriane permit. Last week this test was having lost circulation trouble below 6,370 ft. in a Jurassic section.

... Ab 2, on the Erl-El-Anngueur license, about 50 miles west-northwest of Ghardaia, was drilling below 7,600 ft.

The six geophysical crews employed by the two companies in the central Sahara region of the country have suspended operations but should resume about August 1. The extreme heat in the desert during this part of the year forces an annual shutdown of most operations.

Finance and politics . . . The new French Minister for the Sahara, M. Lejeune, painted a rosy picture of the French oil future in Algeria last week, but he warned it means moving fast and with hard cash.

Lejeune returned from a visit to Algeria and told private French capital it can expect a request for a loan from the French Government by September. The new minister talked in terms of $1,120,000,000.

He said oil should be moving from Hassi Messaoud to the railroad at Touggourt by January and he hopes a large diameter line can be completed within 18 months to Bougie on the Mediterranean coast.

The French minister added an interesting sidelight to his remarks with the disclosure that new underground water reserves have been discovered in the Sahara. He called them as important as the oil. Lejeune said a well drilled at Ouargla flowed more than 5,000 bbl. of water an hour.

Water and money are about equally important to the French in their almost desperate effort to develop the oil resources of the Sahara region. The country's need for an oil supply outside the Middle East is a major factor in French desires to hang onto Algeria in the face of mounting nationalism.

If they can develop an oil supply big enough to satisfy a sizable portion of metropolitan French demand, it will be much easier to convince the French public that the battle to keep Algeria is worth the effort, blood, and money it is costing.

Gas Slows Karachi Test

HIGH-PRESSURE gas pockets have slowed drilling by Pakistan Petroleum, Ltd., at the company's deep test in Karachi.

Gas encountered below 9,000 ft. in the 1 Drigh Road amounted to only a few bubbles in the drilling mud. But "pressure was extremely high."

P.P.L. took no chances. It shut in the well for 5 weeks until high-pressure wellhead equipment could be flown from the United States. The test is located in a built-up area within the city limits of the nation's capital.

Higher in the hole the company had changed to a high-weight mud when high-pressure bubbles first appeared.

The hole currently is at 9,958 ft. It has encountered one promising limestone section. Three tests, however, were disappointing. P.P.L. plans to acidize. But this step is being delayed by a fishing job for a drill bit.

Tanker Case Ends

Justice rules butanized crude covered in charter

BUTANIZED CRUDE oil is legally "crude oil" under definition of an English judge.

Mr. Justice Pearson has ruled in the Law Courts in London that British Petroleum Co. did not violate its contract by calling on the Atlantic Oil Carriers, Ltd., to haul butanized crude from the Persian Gulf to England.

Cargo in the tanker, Atlantic Duchess, exploded February 2, 1951, alongside the wharf of the National Oil Refineries, Ltd., at Swansea, Wales. Seven persons were killed and 14 injured. The ship almost split in two.

The tanker firm brought suit against British Petroleum for more than $2 million damages. The hearing in the 6½-year-old case lasted 28 days, and a half million words of testimony were taken.

Pearson held for the defendant on all three major issues—that (1) butanized crude is actually "crude oil" under terms of the charter agreement, (2) the cargo did not involve special hazards the tanker owners did not know about, and (3) no proof was made that the additional butane was responsible for the explosion.

Under the agreement with the tanker firm, British Petroleum could load the vessel with "crude oil or fuel oil and/or diesel oil and/or distillate of petroleum." The ship's owners said the crude had a butane content of 6 per cent by weight and a 10-lb. Reid vapor pressure.

The bill of lading described the cargo as butanized crude oil, and the judge said the cargo fell within the definition of crude oil.

British Petroleum suggested during the long trial that the explosion was caused by smoking or other negligence on the part of the ship's employes.

Representatives of several United States oil companies attended the trial. Sun Oil Co. submitted an affidavit stating it has shipped butanized crude from the Gulf of Mexico to Philadelphia.

Royal Dutch-Shell gave evidence that "tailored crudes" often are shipped to destinations where there is demand for them.

Market isn't attractive—so . . .

. . . Shell and BP Quitting Israel

ISRAEL will soon become the only civilized country in the free world in which not one major world oil company markets its products.

The last two major marketers in Israel, the Royal Dutch-Shell Group and British Petroleum Co., said last week they are leaving the country because operations there are not "commercially attractive."

Socony Mobil Oil Co.'s marketing affiliate in Israel sold out last December.

The future of the Haifa refinery, jointly owned by British Petroleum and Shell, is still in doubt. The 84,000-bbl. plant, operated by Consolidated Refineries, Ltd., has been producing at sharply reduced throughput since the Haifa line of the Iraq pipeline system was cut in 1948 by the Arabs.

The two companies said they are attempting to sell their marketing facilities in the country. They have agreed to continue operations for at least another 6 months.

Spokesmen said any decision on the refinery will await disposal of the marketing outlets in Israel. It is doubtful if the two companies would continue to operate the refinery at a fraction of its normal capacity after they no longer market in Israel.

Israeli officials in Jerusalem were quoted in press reports last week as saying they had been warned that the two companies were being pressured by the oil-producing Arab world to curtail operation in Israel. In New York, spokesmen for the companies denied the reports emphatically. They said economic reasons were the only factors involved.

The Haifa refinery has been operating at only about 16,000 bbl. daily to satisfy Israel's domestic demand. Its crude supply has been largely Venezuelan except for shipments of Iranian crude which the Israelis have bought up quietly in spite of the Moslem world attempt to ban all oil sales to Israel.

Even Russia cut off the shipments of crude and fuel oil she had contracted to send Israel late last year when the Israeli-French-British attack on Egypt took place.

The refining operation has been less profitable for the Shell-B.P. combine ever since the outbreak of the Israeli-Arab war 9 years ago. Once a major supplier of refined products to Europe, the refinery was exempt from taxation under the British Palestine mandate.

Since creation of Israel, however, the refinery has been subject to taxation, and the companies have been obliged to make a sizable portion of output available to the government-sponsored distribution company in Israel.

Panama Refinery Site Picked

THE Panama Refining & Petrochemical Co., Inc., will build its 55,000-bbl. refinery at Portobelo Harbor, 15 miles northeast of the Caribbean entrance to the Panama Canal.

Selection of the site was one of the final details to be settled before construction could begin. Work on the plant is scheduled to start shortly.

The $33,000,000 refinery will be built on an abandoned U. S. Air Force emergency landing field next to the village of Portobelo in the State of Colon.

Panamanian President Ernesto de la Guardia, Jr., signed an executive resolution giving the company a 360-acre tract. He also signed a decree making the harbor an international port.

Portobelo is one of the world's finest natural harbors. The water is more than 60 ft. deep in most places, often within 300 ft. of shore. This will permit entry of virtually any ship.

A T-type pier will be built, enabling the company to service three ships at one time.

Panama Refining is owned by two financial men, Eugene Du Pont III of Wilmington, Del., and John M. Shaheen of New York. They have several associates in Panama. An independent American refining company will operate the plant for them.

Spadework for securing supplies and a market has been completed. Shaheen, president of the company says "We have signed contracts with several major U. S. oil companies for a 10-year supply of crude oil and for the entire output of the refinery for the next 10 years."

The company also has a tax umbrella for 25 years, during which no income taxes will be levied on exports, including shipments to the Canal Zone (OGJ, May 20, p. 131).

Foster Wheeler Corp. of New York is the prime contractor.

First Test Ready

Sloane to spud 5,000-ft. Guatemalan hole this week

THE FIRST WILDCAT ever to be drilled in Guatemala is scheduled to be spudded about August 2 or 3.

Sloane Exploration Co., a Houston-based firm, was rigging up last week at the first drilling site on its new Morales concession about 35 miles southwest of Puerto Barrios. The company had hoped earlier to start drilling late this month (OGJ, July 15, p. 78).

Story J. Sloane, Sr., president, said projected depth of the first test is 5,000 ft. or basement formation at a lesser depth.

Location is in the northwestern part of the 48,000-acre Morales concession near the Honduras border. This is one of 38 concessions covering some 9,000,000 acres granted by Guatemala under its new petroleum code.

The Sloane rig, rated at 7,000 ft., was designed for transportation by airplane to remote jungle locations. Air transportation was not necessary in the first move, however, since the location is just off a main highway.

New Rig Sent to Nigeria

THE FIFTH RIG for the stepped up operations of Shell-BP Petroleum Development Co. of Nigeria Ltd. has arrived at Port Harcourt. The outfit, capable of 12,000 ft., will renew drilling of 2 Ituk in eastern Nigeria.

The well was shut down last year because of mechanical trouble.

Shell-BP exploration will get a further boost in October when its first drilling barge will arrive. The barge will be used in the tidal area of the Niger Delta.

Designed for 6,000 cars a day:

Bridge to Span Lake Maracaibo

A $99,000,000 prestressed concrete bridge will span the head of Lake Maracaibo within 3 years.

When opened in 1960, it will end the isolation of oil activities on the western side of the lake. It will shorten the travel time from Maracaibo to other cities on the eastern side by easing the flow of traffic on present highways.

On days when they have business on the Lagunillas side, many oil company employes now are at the Maracaibo slip by 4 a.m. to make sure they get a ferryboat ride in the morning rush.

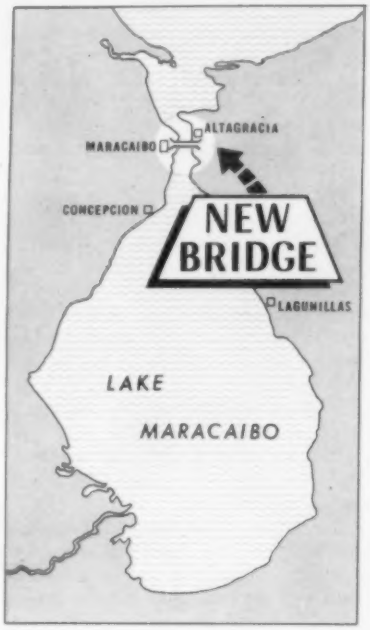
The shore-to-shore length of the bridge will be 5½ miles. It will cross a neck of the lake from Piedras Point to Iguana Point, a few miles south of Maracaibo.

The central span will be 1,312 ft. long, reaching 152 ft. above the surface of the water. Tankers and other large ships will use the central span. Smaller vessels will sail under shorter spans.

Total width will be 72 ft. This will include two two-lane highways. A roadway for a standard-gage, single-track railroad will run down the middle. Sidewalks will be on the outer edges.

The bridge is one of the Venezuelan Government's most important development projects. Maracaibo has a booming population of almost 400,000. Lagunillas, across the lake, has a population of 200,000.

Traffic between the cities is now limited to 700 vehicles daily. Six thousand vehicles daily are expected to use the bridge when it opens in 1960.



The construction contract went to Precomprimido C.A., a Caracas firm, for 329,580,000 bs. ($98,874,000). A German firm, Demag Aktiengesellschaft, also will participate. Ricardo Morandi, an Italian engineer, was the designer.

Four million bags of cement needed for the job will be manufactured in Venezuela. Fifty thousand tons of steel for reinformement will be imported.

New Firm Enters Foreign Exploration

WESTERN HEMISPHERE Petroleum Corp. last week offered $2,000,000 in common stock to finance exploration activity on its foreign properties.

The company was formed recently to consolidate the holdings of Russell Cobb, Jr., Tulsa independent, and several associates.

Cobb last week said the company will enter foreign exploration work as rapidly as possible, evaluating presently owned concessions and acquiring new ones as opportunities arise.

The company is interested in:

... **Canada,** where it holds a prospecting license on about 49,770 acres in the Athabasca tar-sands region of Alberta.

... **Honduras,** where it owns stock in Petroleos Hundurenos. This Honduras company holds an 11,000,000-acre exploration concession covering other minerals as wells as oil.

... **Colombia,** where it has applications pending on two oil concessions covering 194,082 acres. One is in Cauca Province on the southeast coast; the other is in Magdalena Province about 30 miles from the Venezuelan border. The firm also has an option to buy a concession in Magdalena where barite, used in drilling muds, has been found.

... **Cuba,** where the company owns stock in two corporations with concession rights to 1,158,868 acres. One, Cavalier Petroleum Co. of Cuba, plans several tests in the next year.

... **Haiti,** where it has a nonexclusive exploration permit covering 650,000 acres in the Central Plateau area.

Cobb is president of Western Hemisphere. Other officers are Richard L. Hull, Tulsa attorney, vice president and treasurer, and William J. Casey, New York attorney, secretary.

Directors include E. R. Thomas, Jr., New York investment broker; Nathan Appleman, N. Appleman Co., New York; Raymond F. Kravis, Tulsa consultant; and Jesse A. Sanders, Sanders & Co., Dallas.

Refinery Sought

West Pakistan shooting for self-sufficiency in products

FOUR MARKETING companies have agreed to a request by the Pakistan Government to submit a joint proposal for setting up the country's first major refinery.

The companies are Burmah Oil Co., Royal Dutch-Shell, Standard-Vacuum Oil Co., and Caltex. They would advise the government on various aspects of the project, including location and marine facilities.

The government has indicated that the refining company should be registered in Pakistan and that Pakistani capital should participate. Private local capital or the government now has an interest in all exploration companies operating in the country.

Presumably the refinery would be large enough to make West Pakistan self-sufficient for most product needs. Pakistan's capital, Karachi, is one of the possible locations believed under study.

The only refinery now operating in the country is a 5,000-bbl. plant at Rawalpindi operated by Attock Oil Co., Ltd.

Kuwait Terminal Enlarged

THE WORLD'S BIGGEST tanker-loading terminal is being expanded.

Mina-al-Ahmadi, the funnel through which Kuwait pours its crude into world markets, will undergo a major expansion. A new oil jetty will be built to the north of the present terminal and should be completed by the middle of 1959.

The loading capacity of the terminal is already more than 1,200,000 bbl. daily. This will be increased to 1,500,000 bbl. by September, when the new jetty will be started. The installation now can accommodate eight supertankers, and in another 60 days it will have two new offshore loading berths served by 24-in. crude lines.

the OIL AND GAS JOURNAL

JULY 29, 1957

What happened, what's ahead . . .

Well completions in last half will be up 3,912 . . . Low first half will hold total for the year to 55,434 wells . . . Wildcat drilling was off in first half, but good discoveries were reported in many areas . . . Domestic demand gained only 1.1 per cent in first half . . . Volumetric gain in exports was four times domestic demand increase . . . Better gains are forecast for last half . . . Crude production set a new record in first half but will be cut back for last half . . . Crude imports may top 1,200,000 bbl. daily for the third quarter . . . Production at natural-gasoline and cycling plants averaged 815,600 bbl. daily for first half and will be almost 832,000 bbl. daily in last half . . . Refinery runs averaged better than 8,000,000 bbl. daily for first 6 months . . . Surplus inventories produced soft refinery markets . . . Pipeline outlook for the year: 14,000 miles natural gas, 5,500 miles crude oil, and 3,000 miles product lines . . . Optimistic Canada plans more than 1,700 wells for the last half.

Let's look at the future . . .

Total domestic demand for petroleum liquids will climb to 10,600,000 bbl. daily by 1960 and to 13,250,000 bbl. daily by 1965 . . . Percentage gains in the future will be less than in the past . . . Natural-gas requirements will rise to 16.32 trillion cubic feet by 1965 . . . Production of petroleum liquids in this country will reach 10,890,000 bbl. daily by 1965 . . . New liquids needed in 1965 for production and additions to reserves will be 5.7 billion barrels . . . New gas needed for that year will be equivalent to another 3.8 billion barrels of crude . . . The ratio of total reserves to production has been going down but will tend to level off . . . Oil and gas found per well will continue a downward trend . . . It will take over 82,000 wells to find the oil and gas needed in 1965 . . . Changes in refinery processing will be more important than increased throughput by 1965. Runs will be 11,200,000 bbl. daily . . . Gains in use of natural gas will call for about four major gas lines a year.

Headlines and footnotes

Crude-Oil Imports Head for New Highs

(May 27)

Humble Breaks 3-Year-Old Crude Price

● Unable to meet its demand, company jumps prices by 25 to 45 cents a barrel; it's the first major change since the 50-cent hike on June 15, 1953.

(January 7)

Officials spurred to action as . . .

. . . Oil-For-Europe Drive Gets Stuck

● Government asks states to boost output and refiners to cut their runs. European diplomats pressure U. S. to do something after oil movement abroad slows to trickle.

(February 4)

Convoys Sailing Suez

Light vessels resume traffic for first time in 5 months as Nasser and West continue to haggle over toll split

(April 8)

Gray Rules Imports Excessive

● Eisenhower quickly orders an investigation. Double action catches industry by surprise. It came just after Texas house had sent a resolution asking restrictions, and the nation's independents were preparing to chart a joint course of action.

(April 29)

Operators ask:

Why Is Drilling Off?

(March 4)

Production Will Drop

● As crude imports soar to all-time high, Texas slashes allowable to lowest number of producing days in state's history; Louisiana also schedules cutback

(June 24)

SQUABBLES over the European oil lift, prices, and imports kept the industry in a turmoil the first half of 1957.

With the Suez Canal closed and the United States was committed to supply Europe some 500,000 bbl. daily, domestic crude production jumped up to the limits of reshuffled transport facilities to tanker ports. The Government-sponsored Middle East Emergency Committee of big international oil companies pooled tankers for the big lift.

Higher crude prices (25 to 35 cents per barrel) were posted by big buyers in January to bring out additional supply. The outcry from customers, here and in Europe, started a series of congressional investigations. All sorts of charges and countercharges were made against various segments of the industry. Oil's public relations got a black eye.

Finally oil men began to talk back with facts. It developed that Europe was getting all of the oil it had been promised, that domestic output was not held down to force a price increase, that the price rise was justified and overdue. A House committee gave oil a clean bill of health. But a Senate committee used the occasion to raise innuendos about many unrelated industry policies, and proposed a long-range probe.

BY SPRING the Suez Canal and the Iraq pipelines reopened and the European crisis was over. But a domestic crisis immediately arose. There was too much oil here. Domestic production had to be cut back as rapidly as it had been increased. To most everybody's surprise, imports hadn't fallen much even during the peak of the European shortage. Now they started rising rapidly.

Domestic producers renewed their pressure on the Office of Defense Mobilization to do something. Late in April Gordon Gray, new ODM director, certified to the President that crude imports threaten national security. Eisenhower immediately launched a study of the matter, meanwhile asking Gray to seek voluntary curtailment by importers.

THE PRESSURE of excess supply reacted throughout the industry in many ways during the second quarter. Inventories of refined products remained high, and crude stocks, which had been drawn down heavily at the height of the European oil lift, began to climb back up. A general market weakness prevailed.

The abundance of crude, both foreign and domestic, was cited as a reason for the unexpected slump in drilling activity. Other reasons included the bad weather which plagued much of the oil country during the winter and spring, and the administration's tight money and credit policy. Whatever the reasons, the fall-off in well completions caused much concern.

IN TEXAS, and to a lesser extent in other states, the second-quarter reductions in crude purchases pinched producers and raised many problems. Purchaser proration returned in several areas where buyers would not take all oil offered. Many wells—in Texas some 8,000—remained unconnected to pipeline outlets.

Spurred by independent producers, the Texas Railroad Commission began a general investigation of oil-pipeline practices and operations. A possible objective, watched with interest by the entire Southwest, was some

...on first half's top oil news

way to spread the market equitably to all wells and expand the pipeline network. The Suez crisis had shown that lack of internal transportation facilities was a bottleneck to increased availability of domestic oil.

ONE AREA that boomed was the Four Corners region, where Utah, Colorado, New Mexico, and Arizona join. Drilling for gas, both development and exploratory, was going strong but got a fillup in January when El Paso Natural Gas Co. negotiated purchase of Pacific Northwest Pipeline Co., thereby promising further increased market outlets.

This drilling program inevitably found much oil, and by midyear it became apparent that Aneth field, in southeastern Utah, was easily the biggest recent find in this country. Aneth and the surrounding area were estimated to have reserves of around half a billion barrels.

To market the new oil from this remote region, three crude lines were proposed—to Salt Lake City, to Los Angeles, and West Texas lines connecting to the Gulf Coast. One got under way by June—a 600-mile, 14-in. line by Shell Oil and Standard of California to Los Angeles.

WAGES and steel prices both rose during the half-year. The unions made rather high demands in the spring. Some of them settled for an increase of 5 per cent. Considerably later a pattern of 6 per cent increase became accepted, and a threatened general shutdown was avoided. But disagreements over retroactivity, and other contract features, brought strikes to a number of scattered refineries and disrupted the normal flow of crude and products.

In February prices of oil-country tubular goods were advanced an average of 3.5 per cent, adding some $40,000,000 a year to the industry's producing costs. Then at the end of June basic steel prices went up 4 per cent. Prices of refined products were generally advanced a little to cover the wage increase, but crude producers felt that the wage and steel increases just about offset the crude-price increase they had got in January.

IN REFINING, the octane race continued unabated, with the ratings of both regular and premium motor fuel edging up steadily. To make the competition hotter, more companies began marketing the new "third grade," a superpremium with an octane number around the 100 mark. The competitive pressure for constant product improvement caused continued modernization of refineries through installation of new units to handle the several new processes for upgrading refinery cuts.

Two all-new and completely modern big refineries were put on stream on the East Coast—by Tidewater in Delaware and American Oil in Virginia. This considerably increased the growing concentration of refining capacity in the Middle Atlantic states—and enhanced this area as a volume market for imported crude.

AMERICAN producers increased their interest in foreign production. Dozens of them, large and small, got concessions or joined in partnership ventures for exploration and development in almost every part of the world open to foreign capital. The majority of them have had no previous experience in foreign operations. It began to look something like a parade of operators to faraway places.

As prorating picks up again . . .

. . . Texas Shaves Allowable

(April 29)

Four Corners Line Jells

- Shell-Standard of California combine plans to complete crude line to Los Angeles late this year
- But Texas-New Mexico insists plan for line from Four Corners to the southeast remains unchanged

(February 11)

High Stocks + Low Demand = Trouble

(June 17)

Labor Costs Rise

New 6 per cent pattern will add $175,000,000 to oil's wage bill this year; fringe benefits will add still more

(May 20)

Deal with Pacific Northwest adds up to . . .

. . . World's Largest Pipeline In Making

(January 21)

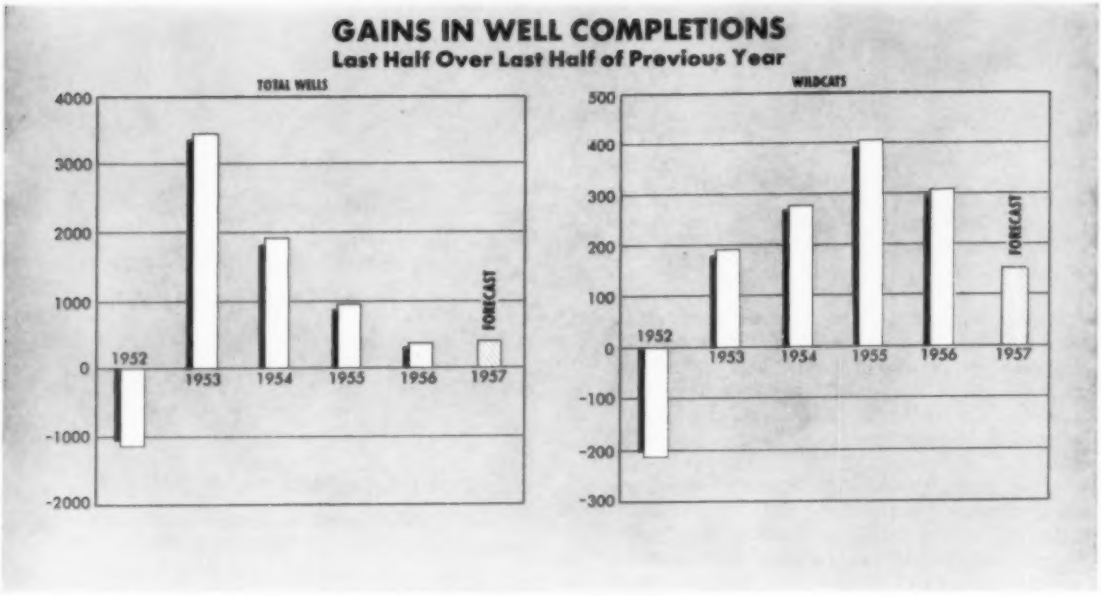
Oil-Country Steel Hiked

- Prices on tubular goods increased by 3.5 per cent; it means a $40-million jump in oil industry costs this year

(February 18)

Octanes Continue Their Upward Climb

(January 28)



Off 3,077 Wells Compared to 1956 but . . .

Drilling Is Slated for Major Gain

DRILLING activity will show a sharp gain in the last half, but completions in the first half set a very low base from which to calculate the increase.

Reports of drilling programs from a large sample of operators show plans for 29,673 wells in the last 6 months of the year. The total represents a gain of 3,912 wells over actual completions in the first half. This is a good gain, but the base is low.

Total completions of 25,761 wells in the first 6 months meant that drilling was off 3,077 wells from the first half of 1956. Since this volume of drilling can not be made up in the last half, the total for 1957 will be under the record set in 1956.

Based on actual completions in the first half and company plans for the last half, a total drilling for the year is forecast at 55,434 wells compared with 58,160 for 1956. This is a decrease of 2,726 wells.

Most of the drop in drilling is in development wells. The forecast calls for 42,734 field wells this year, a decrease of 2,392 from the all-time record set in 1956. The exploratory program with 12,700 wildcat wells falls short of last year by only 334 wells.

Footage results . . . Deeper drilling within individual states or districts and larger gains in the deep-well states result in a better showing for footage drilled than wells completed.

The 55,434-well program represents a decrease of 4.7 per cent from actual completions in 1956. The forecast of total hole to be cut is only 1.6 per cent less than last year.

This means that the average well will be deeper. The average hole drilled in 1956 was 4,022 ft. deep. For the first half of this year average footage per hole

FORECAST FOR YEAR 1957
(First half actual plus last half forecast)

	Wildcat wells	Field wells	Total wells	Total footage (thou. ft.)
Alabama	27	55	82	809
Arkansas	184	916	1,100	3,249
California	596	1,769	2,365	10,454
Colorado	686	353	1,039	5,399
Florida	9		9	62
Illinois	682	2,344	3,026	6,851
Indiana	120	600	720	1,173
Kansas	930	3,318	4,248	15,424
Kentucky	321	1,185	1,506	2,283
Louisiana	725	3,190	3,915	30,882
North	199	1,225	1,424	5,294
South	526	1,965	2,491	25,588
Michigan	173	232	405	1,153
Mississippi	205	230	435	3,121
Montana	202	251	453	2,458
Nebraska	429	380	809	4,718
New Mexico	332	1,874	2,206	10,088
New York	14	480	494	625
North Dakota	123	168	291	2,000
Ohio	11	1,066	1,077	2,694
Oklahoma	794	6,042	6,836	23,946
Pennsylvania	73	760	833	2,607
South Dakota	30		30	144
Texas	5,532	16,109	21,641	92,567
Dist. 1 and 4	961	1,684	2,645	10,899
Dist. 2 and 3	852	1,698	2,550	17,215
Dist. 5 and 6	413	881	1,294	6,971
Dist. 7-B and 9	2,243	5,257	7,500	21,568
Dist. 7-C and 8	963	5,343	6,306	30,710
Dist. 10	100	1,246	1,346	5,204
Utah	117	133	250	1,415
West Virginia	32	618	650	1,777
Wyoming	326	647	973	4,201
Miscellaneous	27	14	41	160
Total U. S.	**12,700**	**42,734**	**55,434**	**230,260**
Western Canada	891	2,240	3,131	14,569

jumped to 4,182 ft. Part of this gain was due to deep wells, but the most important factor was the shift in drilling by areas. For example, the big decreases in completions in the first half were in Illinois, Kansas, and Oklahoma. The average well for each of these areas is shallower than for the county as a whole.

The average well drilled in the last half will be about 4,129 ft. Note the gains forecast for these same areas: Illinois, up 654 wells; Kansas, up 192; and Oklahoma, up 684 wells. These increases in areas with shallow drilling will be enough to influence the depth of the average well but not enough to bring total completions in these states up to 1956 levels.

Some areas gain . . . Despite a decrease in total wells to be drilled this year in this country, some of the important areas are showing gains. The largest increase will be in West Texas. That area had 5,707 wells last year, and the outlook for this year is for 6,306. This is a gain of 599 wells in a year when decreases dominate the drilling picture.

Other important areas slated for increases this year are: Louisiana Gulf, up 318; New Mexico, up 302; East Texas, up 161; Utah, up 109; the Dakotas, up 49; and Wyoming, up 43.

Wildcat wells accounted for 22.57 per cent of total drilling in the first half. This average is a little higher than for the first half of 1956. Last-half programs call for another gain in this ratio to 23.21 per cent, the highest since the last half of 1952.

The gain of almost 4,000 wells in the last half over the first reflects two influencing factors. First, normal growth in well drilling would place more wells in the last half of the year. For the last 7 years, there has been only one year when last-half completions dropped below the total for the first half. That was in 1952 when the steel shortage limited drilling.

The second cause was the series of conditions that cut drilling to the lowest level since the first half of 1953. The weather slowed field work in many areas. Greater expenditures for deeper drilling reduced funds for shallow areas. More of the total money allocated for oil hunting went to foreign areas. In fact, many operators listed tight money as a reason for the first-half slowdown.

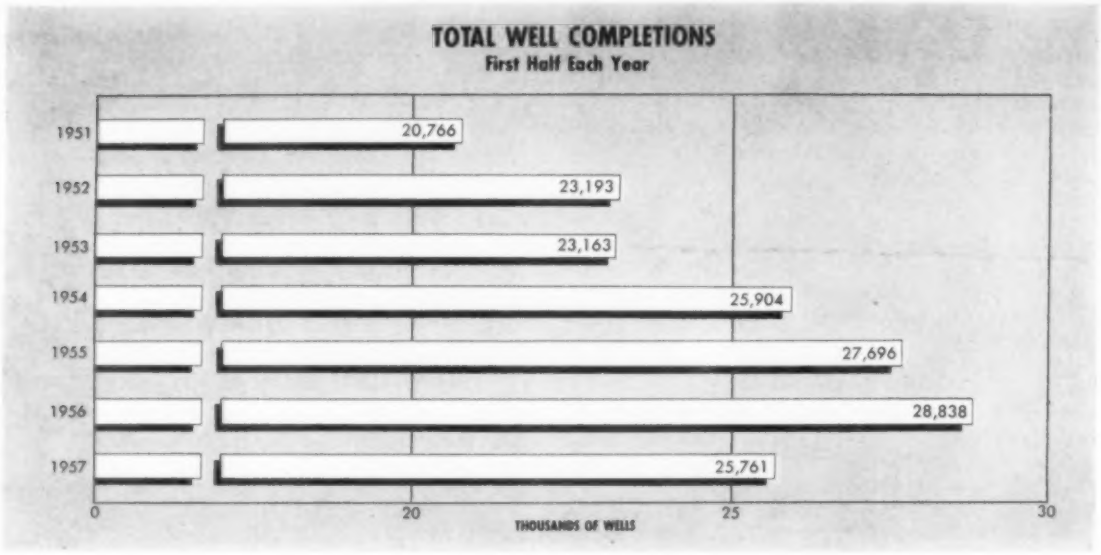
Last-half revival should begin to show in August completions.

WILDCAT PERCENTAGE OF TOTAL DRILLING

	Wildcat wells	Total wells	Wildcat per cent of total
1951: First half	4,531	20,766	21.82
Last half	5,771	23,750	24.30
1952: First half	4,992	23,187	21.53
Last half	5,560	22,634	24.56
1953: First half	5,309	23,163	22.92
Last half	5,753	26,116	22.03
1954: First half	5,251	25,904	20.27
Last half	6,029	28,026	21.51
1955: First half	5,840	27,696	21.09
Last half	6,431	28,986	22.19
1956: First half	6,301	28,838	21.85
Last half	6,733	29,322	22.96
1957: First half	5,814	25,761	22.57
Last half	**6,886**	**29,673**	**23.21**

DRILLING FORECAST, LAST HALF 1957

	Forecast last half 1957				Increase over first half 1957			
	Wildcat wells	Field wells	Total wells	Total footage (thou. ft.)	Wildcat wells	Field wells	Total wells	Total footage (thou. ft.)
Alabama	15	19	34	316	3	—17	—14	—177
Arkansas	94	515	609	1,791	4	114	118	333
California	340	980	1,320	5,839	84	191	275	1,224
Colorado	405	220	625	3,248	124	87	211	1,097
Florida	2		2	22	—5		—5	—18
Illinois	390	1,450	1,840	4,144	98	556	654	1,437
Indiana	58	360	418	680	—4	120	116	187
Kansas	530	1,690	2,220	8,084	130	62	192	744
Kentucky	190	650	840	1,274	59	115	174	265
Louisiana	387	1,675	2,062	15,854	49	160	209	826
North	120	690	810	3,002	41	155	196	710
South	267	985	1,252	12,852	8	5	13	116
Michigan	90	120	210	595	7	8	15	37
Mississippi	110	140	250	1,795	15	50	65	469
Montana	138	133	271	1,469	74	15	89	480
Nebraska	210	209	419	2,437	—9	38	29	156
New Mexico	195	983	1,178	5,413	58	92	150	738
New York	13	260	273	394	12	40	52	163
North Dakota	68	87	155	1,044	13	6	19	88
Ohio	7	551	558	1,391	3	36	39	88
Oklahoma	440	3,320	3,760	13,170	86	598	684	2,394
Pennsylvania	38	442	480	1,401	3	124	127	195
South Dakota	12		12	65	—6		—6	—14
Texas	2,856	8,177	11,033	47,650	180	245	425	2,733
Dist. 1	195	385	580	1,502	—16	—25	—41	—95
Dist. 2	158	205	363	2,288	19	—9	10	67
Dist. 3	290	640	930	6,459	25	1	26	212
Dist. 4	305	435	740	4,003	55	—19	36	206
Dist. 5 and 6	221	455	676	3,639	29	29	58	307
Dist. 7-B and 9	1,120	2,652	3,772	11,019	—3	47	44	470
Dist. 7-C and 8	513	2,790	3,303	16,140	63	237	300	1,570
Dist. 10	54	615	669	2,600	8	—16	—8	—4
Utah	68	94	162	917	19	55	74	419
West Virginia	19	326	345	949	6	34	40	121
Wyoming	194	380	574	2,483	62	113	175	765
Miscellaneous	17	6	23	92	7	—2	5	24
Total United States	**6,886**	**22,787**	**29,673**	**122,517**	**1,072**	**2,840**	**3,912**	**14,774**
Western Canada	501	1,203	1,704	7,938	111	166	277	1,307



First decrease in 15 years shown as . . .

Operators final 3,077 fewer wells

TOTAL WELLS drilled in the United States the first half of 1957 were down 3,077, or nearly 11 per cent, compared with the same period last year. This is the first such decrease in 15 years.

Drilling was off in more than half of the states, compared with the previous year, and the reasons differed from area to area. States showing substantial increases included Louisiana (offshore), Arkansas, New Mexico (North and Southeast), New York, North and South Dakota, Utah, and Wyoming. In Texas, Railroad Commission Districts 5 and 6 (East), 7-C and 8 (West), 9 (North) and 10 (Panhandle) all had more drilling in 1957 than in 1956.

The following is a brief explanation for the major increases or decreases shown by the table "Summary of Completed Wells, First 6 Months."

. . . Arkansas. Total-well figures this year was 491, compared with 386 last year, up 105 wells and 27 per cent. Most of this percentage was in Stephens field, Ouachita County. Drilling is very shallow, running 1,200-1,500 ft.

. . . California. Total wells were about the same as last year at 1,045 in 1957, and 1,086 in 1956.

. . . Colorado. A general decrease in the Denver basin accounts for the 29 per cent loss in total completions this year. The figures are: 414 wells in 1957, compared with 585 last year, down 171 wells.

Completions in the Rocky Mountain states are up, being stimulated by a number of discoveries in 1957. Additional pipeline outlets have resulted in more drilling. Exploration to the Precambrian and the discovery of pay zones below the old 8,600-ft. production in Williston basin have accounted for an upturn in total completions for that area. In eastern Montana, Mission Canyon (5,500-ft.) pay has been added to the regular 9,000-ft. production, and in Sheridan County, Silurian production has been opened below 10,000 ft.

. . . Illinois. Drilling here took a drop of 619 wells at the midyear point, 1957, or a loss of 34 per cent. Totals were 1,186 this year compared with 1,805 last year. Illinois operators are not too discouraged over this poor showing. They say the state has always operated in up or down cycles, and they are just waiting for the next one.

. . . Kansas. Totals are down from 2,537 last year to 2,028 this year, a decrease of 509 wells and 20 per cent. The situation reflects a general Mid-Continent down trend.

. . . Kentucky. Drilling was off 172 wells, representing 20.5 per cent. Totals were 666 wells in 1957 com-

COMPLETIONS BY MONTHS

	Jan.	Feb.	Mar.	Apr.	May	June
Wildcats						
Crude	156	110	85	99	118	85
Cond.	12	3	12	10	16	4
Gas	50	43	34	32	49	30
Dry	1,118	761	712	677	936	662
Total	**1,336**	**917**	**843**	**818**	**1,119**	**781**
Development						
Crude	2,471	2,112	2,041	2,004	2,410	1,876
Cond.	28	8	26	31	46	26
Gas	311	258	312	220	283	256
Dry	1,012	712	916	784	995	809
Total	**3,822**	**3,090**	**3,295**	**3,039**	**3,734**	**2,967**
Total Wells						
Crude	2,627	2,222	2,126	2,103	2,528	1,961
Cond.	40	11	38	41	62	30
Gas	361	301	346	252	332	286
Dry	2,069	1,422	1,441	1,374	1,838	1,405
Service	61	51	187	87	93	66
Total	**5,158**	**4,007**	**4,138**	**3,857**	**4,853**	**3,748**
Total Footage (1,000 ft.)						
Wildcat	6,528	4,378	4,193	3,989	5,490	3,893
Development	14,965	12,533	12,492	12,165	14,865	12,252
Total	**21,493**	**16,911**	**16,685**	**16,154**	**20,355**	**16,145**

Where wells were completed in first 6 months

	Total wells	Crude	Cond.	Gas	Dry	Service	Footage (1,000 ft.)	Total Jan.-June 1956
Alabama	48	36	0	1	11	0	493	42
Arizona	3	0	0	1	2	0	14	0
Arkansas	491	331	0	11	149	0	1,458	386
California	1,045	733	1	25	283	3	4,615	1,086
Colorado	414	63	0	31	320	0	2,151	585
Florida	7	0	0	0	7	0	40	4
Georgia	2	0	0	0	2	0	9	6
Illinois	1,186	458	0	10	718	0	2,707	1,805
Indiana	302	107	0	11	182	2	493	305
Kansas	2,028	899	1	175	918	35	7,340	2,537
Kentucky	666	251	0	77	338	0	1,009	838
West	574	246	0	6	322	0	744	737
East	92	5	0	71	16	0	265	101
Louisiana	1,853	964	24	212	653	0	15,028	1,935
North	614	362	1	53	198	0	2,292	791
South	877	385	20	121	351	0	9,274	922
Offshore	362	217	3	38	104	0	3,462	222
Michigan	195	78	0	2	115	0	558	229
Mississippi	185	61	6	1	117	0	1,326	218
Missouri	6	0	0	3	3	0	8	33
Montana	182	95	0	2	85	0	989	175
Nebraska	390	122	0	1	267	0	2,281	524
West	385	122	0	1	262	0	2,269	502
East	5	0	0	0	5	0	12	22
Nevada	2	0	0	0	2	0	10	3
New Mexico	1,028	552	3	279	194	0	4,675	915
Northwest	379	68	1	263	47	0	1,552	350
Southeast	649	484	2	16	147	0	3,123	565
New York	221	106	0	2	1	112	231	155
North Dakota	136	79	0	0	57	0	956	119
Ohio	519	281	0	88	98	52	1,303	510
Oklahoma	3,076	1,767	58	100	982	169	10,776	4,319
Oregon	1	0	0	0	1	0	5	3
Pennsylvania	353	93	0	133	43	84	1,206	359
South Dakota	18	0	0	0	18	0	79	3
Texas	10,608	6,233	129	475	3,690	81	44,917	10,960
Dist. 1	621	339	3	14	264	1	1,597	869
Dist. 2	353	96	22	74	161	0	2,221	409
Dist. 3	904	405	44	69	379	7	6,247	930
Dist. 4	704	262	44	95	302	1	3,797	751
Dist. 5 & 6	618	307	0	44	267	0	3,332	564
Dist. 7-B	1,370	700	0	15	653	2	4,417	1,638
West	3,003	2,360	0	31	604	8	14,570	2,850
Dist. 9	2,358	1,281	0	31	985	61	6,132	2,322
Dist. 10	677	483	16	102	75	1	2,604	627
Utah	88	39	0	5	44	0	498	64
Virginia	2	0	0	2	0	0	10	5
Washington	2	0	0	0	2	0	12	2
West Virginia	305	38	0	210	57	0	828	328
Wyoming	399	181	0	21	190	7	1,718	376
Total 6 months 1957	**25,761**	**13,567**	**222**	**1,878**	**9,549**	**545**	**107,743**	
Total 6 months 1956	**28,838**	**15,608**	**267**	**1,911**	**10,564**	**488**	**117,327**	***28,838**

*Incl. Idaho 3, Md. 3, Tenn. 3.

pared with 838 last year. Operators feel the state had a drilling spree in 1956 that just couldn't be matched under normal conditions in 1957. Eastern Kentucky operations held steady, with most of the loss going to the western side.

... **Louisiana.** Total drilling showed a net loss of 82 wells in 1957, or down 4.2 per cent. Most of the decrease was in North Louisiana fields, and especialliy in the old drilled and redrilled Caddo-Pine Island field. This big field was thought to have hit its full stride many times over the past several years, only to come back for additional drilling. Fracturing of the Annona chalk at Caddo-Pine Island propped up drilling for additional years, but now the field appears to have seen complete development.

... **Nebraska.** This area suffered the same relapse

as the Denver basin. Total wells in 1957 were 390 compared with 524 in 1956; down 134 and off 25.6 per cent.

...**New Mexico.** The state's two provinces were up a total of 113 wells in 1957, or 12.3 per cent. Northwest New Mexico had 29 more wells this year, due in part to new gas developments in Blanco field, and oil in Bisti field. Southeast New Mexico operators hit another of their periodic plays on deep drilling and exploration. Total wells were up 84 in 1957, being 649 for the first 6 months compared with 565 in 1956. Outlook is for continued development drilling around its many deep strikes.

...**New York.** Total completions were up from 155 last year to 221 in 1957, a gain of 66 wells and over 42 per cent.

...**Oklahoma.** Total completions were 3,076 in 1957, compared with 4,319 wells last year. This is a decrease of 1,243 wells, or 28.8 per cent. Part of the decline is due to the Mid-Continent slump in operations, part to heavy rains which made roads and fields impassable, especially some of the shallow producing fields, and part to the completion of water-flood projects which required much additional drilling.

...**Texas.** Total well completions were 10,608, down 352 compared with 10,960 in 1956. Railroad Commission Districts 1, 2, 3, 4, and 7-B completed fewer wells this year, giving the state a net decline of 3.2 per cent.

Southwest Texas (District 1) showed the biggest loss, of 248 wells, or 28.5 per cent. Completions in 1957 were 621 compared with 869 for the same period last year.

West Central Texas (District 7-B) suffered a gradual decline in operations. Total completions were off 268 this year, or 16.4 per cent. Total wells in 1957 were 1,370, and 1,638 last year.

East Texas (Districts 5 6) has had an upturn in exploration work this year, plus a good run of discoveries, mostly Woodbine, and subsequent development drilling in new pools. Total wells were 618 this year, over 564 last year, percentage increase is 9.6.

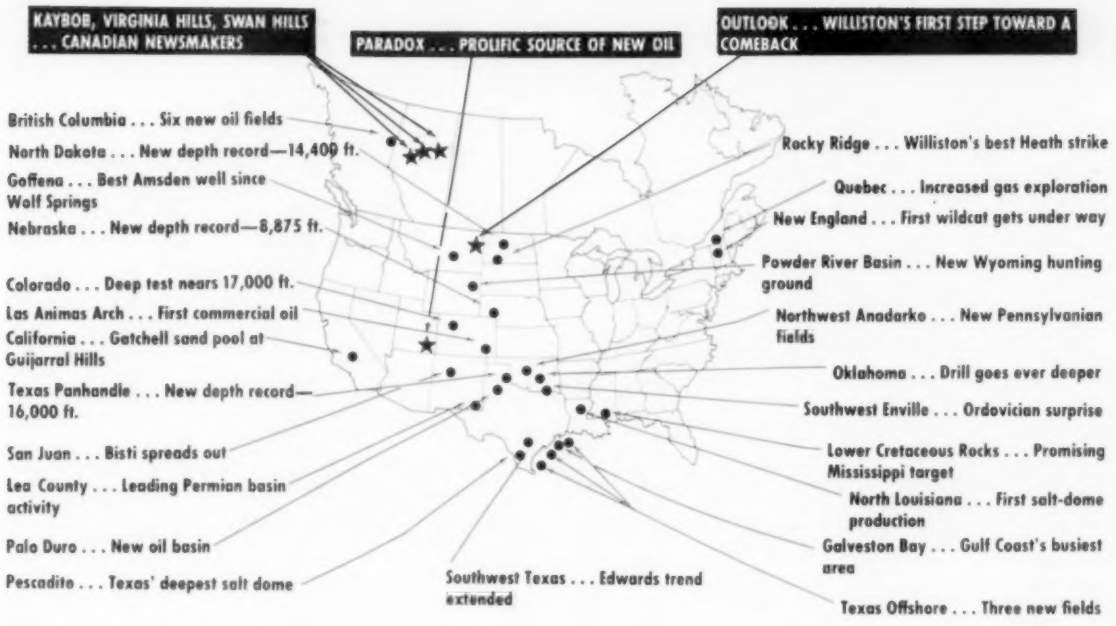
West Texas (Districts 8 and 7-C) were up 5.4 per cent over the same period last year. Total wells were 3,003 in 1957, a gain of 153. Although some drilling contractors reported spotted areas with rigs down, the general trend was steady throughout the Central Basin platform area, and along the eastern shelf. At midyear time, there was a deep-exploration program getting under way in Pecos County.

Texas Panhandle (District 10) was up 50 wells in 1957, for a gain of 8 per cent. Total completions were 677 this year compared with 627 last year. Some of the increase was due to Pennsylvanian drilling in Ochiltree, Hansford, and Lipscomb counties.

"In Texas, total well completions were 10,608, down 352 compared with 10,960 in 1956."

Here's the first-half footage tabulation

	Development			Wildcats		
	Oil	Gas	Dry	Oil	Gas	Dry
Alabama	412,757				1,641	78,528
Arizona					5,648	8,413
Arkansas	843,695	25,905	268,466	51,262	23,281	245,864
California	2,797,914	101,425	296,941	178,347	28,051	1,212,983
Colorado	274,171	117,647	217,115	75,316	48,409	1,318,033
Florida						40,227
Georgia						9,146
Illinois	1,042,111	7,274	1,054,575	40,794	425	561,717
Indiana	168,099	9,224	215,345	11,747		88,912
Kansas	2,885,447	634,999	2,193,778	198,001	86,309	1,341,720
Kentucky	286,060	203,672	335,456	25,070	12,217	146,507
West	274,106	2,965	303,546	21,538	7,440	134,765
East	11,954	200,707	31,910	3,532	4,777	11,742
Louisiana	6,482,722	1,574,541	3,424,287	560,500	623,860	2,362,233
North	1,032,738	245,862	569,736	39,608	39,676	364,460
South	3,638,602	1,003,998	2,089,306	386,762	479,463	1,675,843
Offshore	1,811,382	324,681	765,245	134,130	104,721	321,930
Michigan	223,457	7,122	111,645	25,348		190,766
Mississippi	405,421	4,495	218,472	112,843		585,548
Missouri		1,152	6,691			
Montana	532,152	4,388	107,502	47,791		297,413
Nebraska	639,520		407,335	123,144	3,306	1,107,707
West	639,520		404,745	123,144	3,306	1,098,741
East			2,590			8,966
Nevada						9,973
New Mexico	2,389,349	1,097,985	395,407	231,970	63,965	495,727
Northwest	241,253	1,030,325	50,856	65,639	41,613	121,968
Southeast	2,148,096	67,660	344,551	166,331	22,352	373,759
New York	106,000	5,114	116,500		3,483	
North Dakota	625,257		48,467	36,206		246,230
Ohio	721,372	237,492	329,820	4,395		9,683
Oklahoma	6,037,188	483,961	2,608,116	370,699	56,690	1,219,127
Oregon						4,506
Pennsylvania	159,776	560,531	251,213		114,192	119,793
South Dakota						78,806
Texas	24,638,774	2,002,385	5,787,160	1,984,749	650,717	9,854,599
Dist. 1	691,058	49,894	169,806	27,738	61,905	596,565
Dist. 2	677,947	315,138	324,116	97,366	119,473	686,850
Dist. 3	2,603,349	342,895	1,110,429	275,660	194,949	1,719,816
Dist. 4	1,345,582	405,858	644,818	282,734	133,439	985,310
East	1,591,898	280,981	427,423	57,032	14,157	961,063
Dist. 7-B	2,081,955	25,052	658,553	265,661	25,676	1,359,997
West	10,854,885	131,372	1,101,064	487,248	43,814	1,951,701
Dist. 9	3,006,523	130,474	1,177,430	385,531	39,945	1,392,345
Dist. 10	1,785,577	320,721	173,521	105,779	17,359	200,952
Utah	184,006	18,766	24,359	39,878	15,994	214,817
Washington						11,981
West Virginia	67,106	563,085	135,021		35,594	26,715
Wyoming	662,528	103,046	261,048	60,115	20,540	611,010
Virginia		9,876				
Total U. S.	52,584,882	7,774,085	18,914,719	4,178,175	1,794,322	22,498,684


KAYBOB, VIRGINIA HILLS, SWAN HILLS . . . CANADIAN NEWSMAKERS
PARADOX . . . PROLIFIC SOURCE OF NEW OIL
OUTLOOK . . . WILLISTON'S FIRST STEP TOWARD A COMEBACK
British Columbia . . . Six new oil fields
North Dakota . . . New depth record—14,400 ft.
Goffena . . . Best Amsden well since Wolf Springs
Nebraska . . . New depth record—8,875 ft.
Colorado . . . Deep test nears 17,000 ft.
Las Animas Arch . . . First commercial oil
California . . . Gatchell sand pool at Guijarral Hills
Texas Panhandle . . . New depth record—16,000 ft.
San Juan . . . Bisti spreads out
Lea County . . . Leading Permian basin activity
Palo Duro . . . New oil basin
Pescadito . . . Texas' deepest salt dome
Southwest Texas . . . Edwards trend extended
Rocky Ridge . . . Williston's best Heath strike
Quebec . . . Increased gas exploration
New England . . . First wildcat gets under way
Powder River Basin . . . New Wyoming hunting ground
Northwest Anadarko . . . New Pennsylvanian fields
Oklahoma . . . Drill goes ever deeper
Southwest Enville . . . Ordovician surprise
Lower Cretaceous Rocks . . . Promising Mississippi target
North Louisiana . . . First salt-dome production
Galveston Bay . . . Gulf Coast's busiest area
Texas Offshore . . . Three new fields

Roaring fifties get a rude jolt as . . .

Wildcats show biggest postwar drop

WILDCAT COMPLETIONS dropped 487 wells to 5,814 from the previous year's first half score of 6,301. This is the biggest first-half decrease in wildcat activity since World War II. Despite the drop in exploratory tests, however, new provinces were opened, new stimuli appeared in older areas, and nearly every oil region on the continent was heard from.

Three provinces figured highest in wildcat success . . . Paradox, Williston, and western Canada. Of these the Paradox basin emerged as the exploratory news story of the first half.

No longer a Paradox . . . It is by a quirk of exploratory fate that the area where Utah's first oil production was uncovered in the early part of the century should become the nation's biggest source of new oil. An area that was previously scorned consistently kept its top rung on the success scale each month. The score was eight new fields in this Pennsylvanian reservoir . . . East Desert Creek, Tahonadla, Ohio - Navajo, West Desert Creek, West Recapture Creek, and unnamed pools at Carter 1 Navajo-114 (southeast of Aneth), Continental 1 Navajo-H (link well between East Aneth and Aneth fields), and Superior 1 Navajo-C (southeast of Aneth).

Production from this southeastern Utah trend is nearly 6,000 bbl. per day; lack of outlet facilities is the hindering factor for a greater oil flow. Reserves in the Aneth trend are estimated to be nearly half a billion barrels.

Williston comes through . . . A sudden outburst of discoveries in the northwestern part of the Williston basin shook sleepy exploration in this still-attractive basin.

Three new deep fields were unearthed in northeastern Montana's Sheridan County . . . Outlook, Ruegsegger, and Loucks. Amerada Petroleum Corp. 1 Tange opened Outlook field for 2,742 bbl. of oil per day from the Silurian (the best Williston gage to date) . . . Amerada's Ruegsegger flowed 293 bbl. per day from the Silurian, and the Loucks well made 312 bbl. per day from the Ordovician. This Sheridan County activity is the most important wildcat event to hit Williston since Beaver Lodge. The Montana discoveries are the first big steps in Williston's heralded new era of pre-Mississippian oil-hunting.

Threefold Canadian success . . . An important trio of discoveries in Alberta gave western Canada its greatest wildcat excitement since Red Earth Creek.

The flush discovery of the year is Phillips Petroleum Co. 1 Kaybob, 145 miles northwest of Edmonton. Kaybob flowed at the daily rate of 2,350 bbl. from Devonian-Cooking Lake. This strike is 35 miles west of Virginia Hills-Devonian Slave Point field, adding a significant link to the apparent Devonian trend shaping up from Swan Hills on the northeast through Virginia Hills, then west to Kaybob. These discoveries are the first to produce from the Slave Point and Cooking Lake in western Canada. The three new areas command Canadian exploratory interest this year as oil-hunters north of the border watch intently the outcome of evaluation wells in this new Devonian target.

Regional Happenings

While most of the first-half exploratory news was in the Paradox, Williston, and Canadian provinces, there were important wildcat happenings throughout the continent from New England to California.

Pennsylvanian success in the northeastern Powder River country stirs the nation's second biggest basin.

Wildcats finaled in first half

	Total	Crude	Cond.	Gas	Dry	Footage (1,000 ft.)
Alabama	12	0	0	1	11	80
Arizona	3	0	0	1	2	14
Arkansas	90	12	0	5	73	320
California	256	30	0	5	221	1,419
Colorado	281	14	0	9	258	1,442
Florida	7	0	0	0	7	40
Georgia	2	0	0	0	2	9
Illinois	292	14	0	1	277	603
Indiana	62	6	0	0	56	100
Kansas	400	52	0	17	331	1,626
Kentucky	131	14	0	5	112	184
West	125	13	0	4	108	164
East	6	1	0	1	4	20
Louisiana	338	39	9	50	240	3,547
North	79	7	0	5	67	444
South	213	22	8	37	146	2,542
Offshore	46	10	1	8	27	561
Michigan	83	9	0	0	74	216
Mississippi	95	10	1	0	84	698
Montana	64	6	0	0	58	345
Nebraska	219	20	0	1	198	1,234
West	215	20	0	1	194	1,225
East	4	0	0	0	4	9
Nevada	2	0	0	0	2	10
New Mexico	137	32	1	8	96	792
Northwest	47	12	1	6	28	229
Southeast	90	20	0	2	68	563
New York	1	0	0	1	0	3
North Dakota	55	6	0	0	49	282
Ohio	4	1	0	0	3	14
Oklahoma	354	50	10	9	285	1,647
Oregon	1	0	0	0	1	4
Pennsylvania	35	0	0	15	20	234
South Dakota	18	0	0	0	18	79
Texas	2,676	318	36	96	2,226	12,490
Dist. 1	211	8	0	7	196	686
Dist. 2	139	7	6	20	106	904
Dist. 3	265	19	11	24	211	2,190
Dist. 4	250	30	12	19	189	1,401
Dist. 5 & 6	192	9	0	2	181	1,032
Dist. 7-B	509	67	0	7	435	1,652
Dist. 7-C & 8	450	74	0	8	368	2,483
Dist. 9	614	99	0	7	508	1,818
Dist. 10	46	5	7	2	32	324
Utah	49	7	0	3	39	272
Washington	2	0	0	0	2	12
West Va.	13	0	0	8	5	63
Wyoming	132	13	0	3	116	692
Six mos. '57	**5,814**	**653**	**57**	**238**	**4,866**	**28,470**
Six mos. '56	**6,301**	**843**		**205**	**5,253**	**30,177**

First commercial oil was opened on the Las Animas arch in southeastern Colorado.

Lower Cretaceous rocks are coming into their own in Mississippi . . . four new fields.

Oklahoma drillers are busy with the state's deepest wildcat campaign at Cement and Knox fields . . . Ordovician production appeared where they said there wasn't any (at Southwest Enville in Love County) . . . A coming ultradeep drilling campaign in the Sooner state is aimed at the deep Ordovician rocks . . . Northern Shelf Pennsylvanian drilling spree continues in northwestern Oklahoma.

Palo Duro basin pierced and tapped for oil by Shell Oil Co. at Oldham County, Texas, wildcat.

Galveston Bay is swept by new wave of discoveries . . . Seven new fields opened.

First salt-dome production found at Minden in North Louisiana.

Hopes rise for spread of exploration along deep Edwards trend in Southwest Texas.

New Mexico's northern Lea County dominates Permian basin drilling . . . further development in older areas plus rank wildcatting collects new oil.

. . . and field-well scoreboard

	Total	Crude	Cond.	Gas	Dry	Footage (1,000 ft.)
Alabama	36	36	0	0	0	314
Arkansas	401	319	0	6	76	1,138
California	789	703	1	20	65	3,196
Colorado	133	49	0	22	62	709
Illinois	894	444	0	9	441	2,104
Indiana	240	101	0	11	128	393
Kansas	1,628	847	1	158	622	5,714
Kentucky	535	237	0	72	226	825
West	449	233	0	2	214	581
East	86	4	0	70	12	244
Louisiana	1,515	925	15	162	413	11,481
North	535	355	1	48	131	1,848
South	664	363	12	84	205	6,732
Offshore	316	207	2	30	77	2,901
Michigan	112	69	0	2	41	342
Mississippi	90	51	5	1	33	628
Missouri	6	0	0	3	3	8
Montana	118	89	0	2	27	644
Nebraska	171	102	0	0	69	1,047
West	170	102	0	0	68	1,044
East	1	0	0	0	1	3
New Mexico	891	520	2	271	98	3,883
Northwest	332	56	0	257	19	1,323
Southeast	559	464	2	14	79	2,560
New York	220	106	0	1	113	228
North Dakota	81	73	0	0	8	674
Ohio	515	280	0	88	147	1,289
Oklahoma	2,722	1,717	48	91	866	9,129
Pennsylvania	318	93	0	118	107	972
Texas	7,932	5,915	93	379	1,545	32,427
Dist. 1	410	331	3	7	69	911
Dist. 2	214	89	16	54	55	1,317
Dist. 3	639	386	33	45	175	4,057
Dist. 4	454	232	32	76	114	2,396
East	426	298	0	42	86	2,300
Dist. 7-B	861	633	0	8	220	2,765
West	2,553	2,286	0	23	244	12,087
Dist. 9	1,744	1,182	0	24	538	4,314
Dist. 10	631	478	9	100	44	2,280
Utah	39	32	0	2	5	227
Virginia	2	0	0	2	0	10
West Va.	292	38	0	202	52	765
Wyoming	267	168	0	18	81	1,026
Six mos. '57	**19,947**	**12,914**	**165**	**1,640**	**5,228**	**79,273**
Six mos. '56	**22,537**	**15,032**		**1,706**	**5,799**	**87,150**

The Bisti trend in the San Juan basin is beginning to move again.

Williston gets its best Heath sand well to date, but the offset is dry.

The coming new oil era for British Columbia is helped along by four new fields.

Goffena discovery on Montana plains is first big Amsden success since Wolf Springs.

New drilling-depth records set in: Colorado (Phillips 1 Mannel, Rio Blanco County, nearing 17,000 ft.); Nebraska (Shell 2 Schneider "L," Kimball County, 8,875 ft.); Texas Panhandle (Magnolia 1 Feldman in Hemphill County at 16,000 ft.).

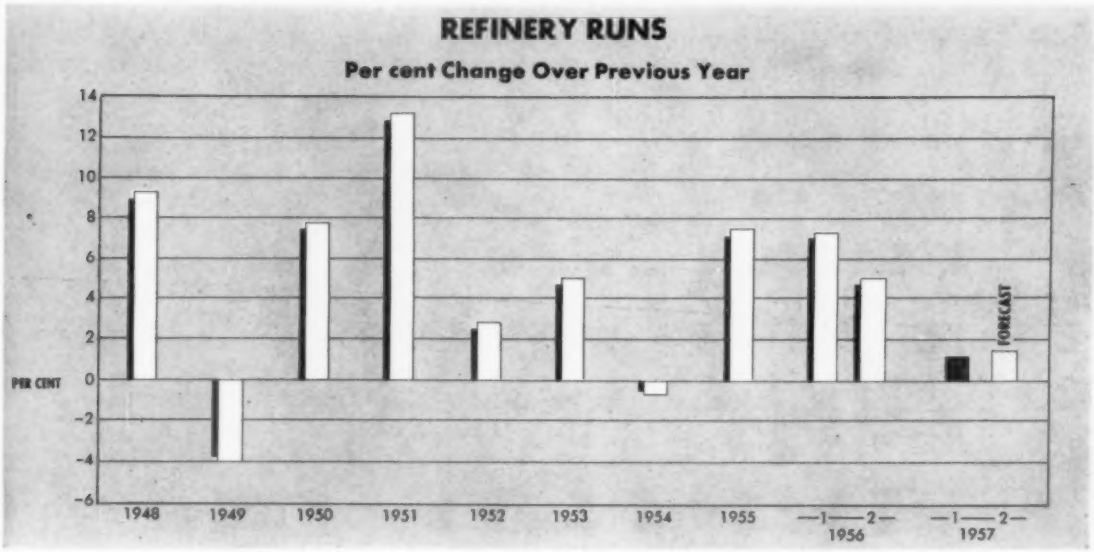
L. A. Harnish's recent prolific Gatchell sand deep-pool discovery at Guijarral Hills in Fresno County, California, looms as the year's best find for the state.

Three new discoveries help keep Texas' offshore prospects alive . . . McFaddin Beach off Jefferson County, an extension of South Sargent field from Matagorda County into the Gulf of Mexico, and the Mustang Island Block 904 discovery of Nueces County.

New England's first wildcat got under way in northwestern Vermont just south of the increasingly active revival of gas exploration in the Quebec Lowlands.

Wildcats beginning to reappear in the Pacific Northwest states of Oregon and Washington.

Pescadito wildcat reveals huge salt dome near Laredo.



Refiner's problems will carry over

REFINERS were in a squeeze during the first half of the year and still have problems for the last half.

Here is a partial list of the typical refiner's troubles:

. . . The weather was warm during the heating season. Domestic demand for light and heavy fuels was less than for the first half of 1956.

. . . Too much rain in the spring and early summer cut farm use of gasoline. The same weather reduced pleasure travel. Gasoline demand was below normal.

. . . Suppliers had too much product stocks in tanks at the end of 1956. For the year 1956, refined-product stocks increased 58 million barrels. Total domestic demand for the year was up only 117 million barrels. Refiners turned out enough refined products to cover the increase in demand with 50 per cent left over. Surplus product stocks at the first of the year represented 50 per cent of the expected gain in domestic demand this year.

REFINERY RUNS BY DISTRICTS—JANUARY-JUNE

(Thousands of barrels daily)

				Per cent change, 1957 over	
	1957*	1956	1955	1956	1955
East Coast	1,203	1,102	1,048	9.2	14.8
Appalachian:					
District 1	99	99	96		3.1
District 2	98	103	93	—4.9	5.4
Ill., Ind., Ky.	1,402	1,393	1,353	0.6	
Minn., Wisc., Dak.	99	86	(†)	15.1	
Okla., Kans., Mo.	689	686	654	0.4	5.4
Texas:					
Inland	270	272	253	—0.7	6.7
Gulf Coast	1,931	1,988	1,828	—2.9	5.6
La. Gulf Coast	674	705	642	—4.4	5.0
N. La.-Ark.	88	86	89	2.3	—1.1
Rocky Mountain:					
New Mexico	28	22	21	27.3	33.3
Other Rocky Mtn.	269	265	249	1.5	8.0
West Coast	1,157	1,099	1,039	5.3	11.4
Total U. S.	8,007	7,906	7,365	1.3	8.7

*Based on 4 months Bureau of Mines and 2 months A.P.I.
†Included in Illinois, Indiana, Kentucky district.

. . . Crude producers received a much-needed price increase at the first of the year, but product markets have not been strong enough for the refiner to recover his additional costs.

. . . Refiners have kept gasoline quality a little ahead of new-car requirements. Soft markets have made it difficult to recover the extra cost.

. . . Most of the export demand during the Suez crisis was for crude. Light and heavy fuels were the only products showing significant export gains.

. . . Wage increases raised processing cost.

There have been only 2 years since World War II with decreases in refinery runs. This year will come close to being the third. First-quarter runs showed a gain of 1.8 per cent over the previous year. The increase dropped to 0.7 per cent for the second quarter. A decrease of 0.4 per cent is forecast for the third quarter. The gain of 3.5 per cent for the fourth quarter must be credited, at least in part, to low runs in the fourth quarter last year. Inventories climbed so fast last year that runs had to be cut 400,000 bbl. daily in October.

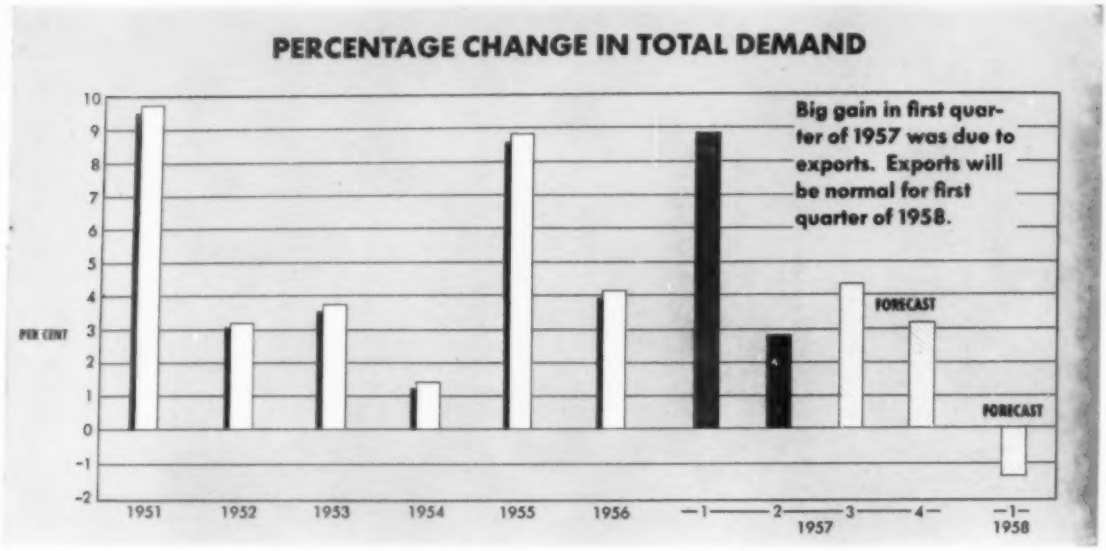
Stock-adjusting runs this year will mean better product markets in 1958.

REFINERY RUNS AND PRODUCTS OUTPUT

(Thousands of barrels daily)

	Runs	Gasoline	Kerosine	Distillate	Residual
1947	5,075	2,235	303	855	1,227
1948	5,549	2,446	333	1,040	1,274
1949	5,326	2,572	280	934	1,164
1950	5,739	2,735	325	1,093	1,165
1951	6,494	3,037	372	1,304	1,286
1952	6,670	3,160	361	1,422	1,240
1953	7,000	3,381	338	1,447	1,233
1954	6,958	3,456	335	1,486	1,142
1955	7,480	3,648	321	1,651	1,152
1956					
First half	7,906	3,753	332	1,797	1,203
Last half	7,968	3,879	343	1,841	1,129
1957					
First half*	8,007	3,821	314	1,892	1,199

*Based on 4 months Bureau of Mines and 2 months A.P.I.



Supply picture is confused, but in first quarter 1958 . . .

Demand will pass 10 million barrels

PETROLEUM DEMAND has been abnormal during the first half of 1957. The conditions responsible for these abnormalities will produce some unusual gains and losses in the last half of the year.

Here are a few of the shifts in the first half and some of the changes forecast for the last half:

. . . Most of the first-half gain in total demand was due to exports.

. . . Total demand gained 8.8 per cent, exports 215 per cent, and domestic demand 2.3 per cent.

. . . Crude exports increased almost 300,000 bbl. daily compared with the small gain of 213,000 bbl. daily for total domestic demand for all products.

. . . Domestic demand for gasoline gained 3.7 per cent in the first quarter but only 0.7 per cent in the second.

. . . Domestic demand for light and heavy heating oils showed a decrease over the previous year. Kerosine demand was off 7.5 per cent.

. . . Exports of light and heavy fuels gained 127 per cent. Exported crude increased 773 per cent.

. . . Domestic demand for L.P.G. barely broke even with last year in the January-April period. This is the first year that L.P.G. has failed to show a good gain since the end of World War II.

. . . Refined-product stocks gained 58 million barrels in 1956. This addition to storage is enough to cover about half the increase in demand forecast for this year.

. . . Since crude accounted for almost half of the increase in total demand, the gain in refinery runs was limited. The increase for the first half was only 1.3 per cent. High product stocks levels indicate a need for a reduction in the third quarter compared with last year.

. . . Despite the tanker shortage while the Suez Canal was closed, total imports for the first half gained 6.1 per cent compared with the 5.9 per cent increase in total demand. Crude imports will reach a peak in the third quarter this year.

. . . Crude production was up 5.0 per cent in the first half but is expected to show a loss in the last half. Crude production for the first quarter of 1958 may be as much as 2.9 per cent below the first quarter of this year.

. . . Domestic demand for all products will average better than 10,000,000 bbl. daily for the first quarter of 1958.

The poor demand showing by gasoline in the first half of the year probably can be charged against three conditions: the weather, the slowdown in over-all economic growth, and shortage in new-car registrations.

Most of the bad effects from the weather, as far as gasoline is concerned, came in the second quarter. Wet weather reduced farm consumption of gasoline during the spring period and even continued into the months of wheat harvesting.

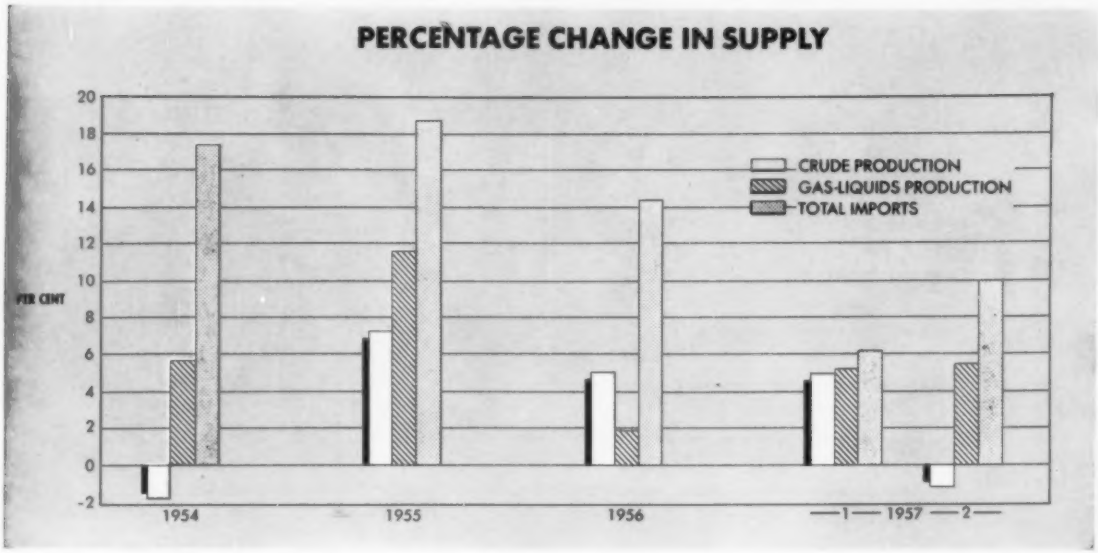
Commercial truck use of gasoline follows shifts in general industrial activity. Since the level of industrial activity was about the same as last year, truck consumption of gasoline probably was about the same as in 1956.

The forecast of supply for the last half had to be based on several assumptions:

Any program for regulating imports could not be put into effect in time to give a reduction in the third quarter.

There will be some cutback in the crude imports for the fourth quarter of this year and the first quarter of 1958. If not, either crude production will be cut or total stocks will increase.

About 135,000 bbl. daily more petroleum will be supplied from inventories during the fourth quarter than last year.

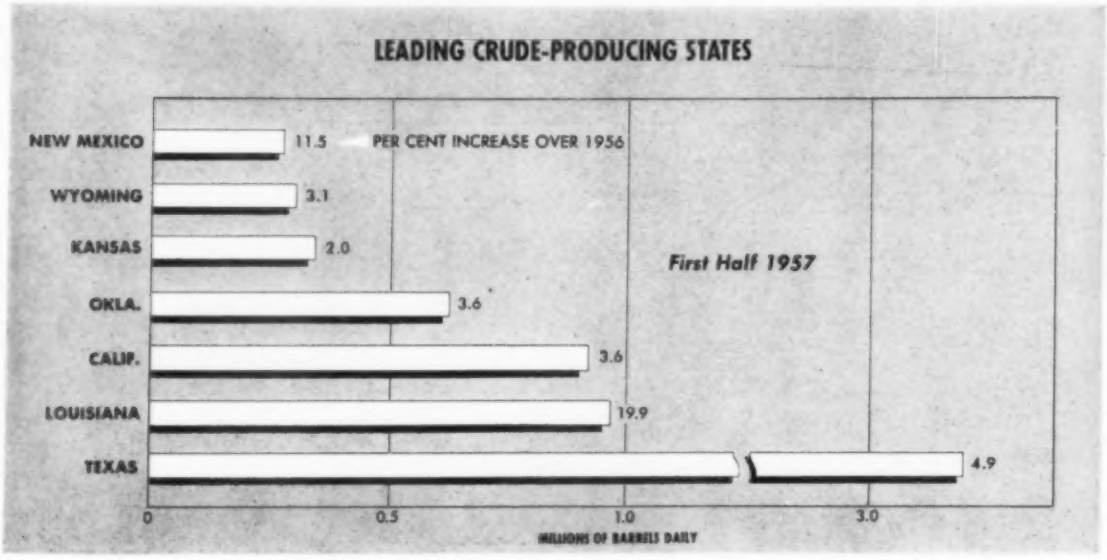


Supply and Demand by Quarters*

(Thousands of barrels daily)

	First half		Third quarter		Fourth quarter		Year 1957		1st quar. 1958		1957-58 Winter quarters volume
	Volume	Per cent inc. over 1956	Volume	Per cent inc. over 1956	Volume	Per cent inc. over 1956	Volume	Per cent inc. over 1956	Volume	Per cent inc. over 1957	
Domestic demand	**9,025**	**1.1**	**8,525**	**4.6**	**9,690**	**7.2**	**9,067**	**3.5**	**10,145**	**4.8**	**9,915**
Gasoline	3,786	2.2	4,110	5.6	3,850	4.4	3,884	3.6	3,680	3.8	3,766
Kerosine	309	—7.5	225	— 2.6	430	12.5	318	—0.6	470	4.7	450
Distillate	1,851	—0.1	1,200	4.5	2,140	13.5	1,760	4.6	2,620	7.4	2,377
Residual	1,602	—1.7	1,270	1.6	1,665	2.0	1,534	—0.1	1,825	1.6	1,744
Lubricants	119		120		125	3.3	121	0.8	119	1.7	122
Jet fuel	230	26.4	235	13.0	225	16.6	230	20.4	237	0.4	231
L.P.G.	430	—0.9	390	2.1	540	15.6	448	4.4	550	10.2	545
Other	698	4.6	975	6.3	715	7.2	772	5.6	644	8.2	680
Exports	**765**	**137.6**	**356**	**— 3.3**	**351**	**—49.9**	**557**	**29.8**	**320**	**—56.0**	**336**
Gasoline	118	42.2	98	— 3.9	90	—24.4	106	9.3	80	—41.2	85
Kerosine	24	242.9	8	100.0	8	—55.6	16	77.8	5	—84.8	7
Distillate	170	174.2	70	— 2.8	75	—57.9	120	27.7	65	—72.3	70
Residual	115	71.6	75	— 7.4	75	—16.7	95	25.0	70	—48.5	72
Lubricants	40	2.6	40	5.3	36		39	2.6	35	— 7.9	36
Jet fuel											
L.P.G.	12	9.1	10	—16.7	10	—23.1	11	—8.3	13		11
Other prod.	24	4.3	25	—10.7	27	8.0	25		22	10.0	25
Crude	262	773.3	30		30	—86.4	145	88.3	30	—90.9	30
Total demand	**9,790**	**5.9**	**8,881**	**4.3**	**10,041**	**3.1**	**9,624**	**4.8**	**10,465**	**— 1.4**	**10,251**
Gasoline	3,904	3.0	4,208	5.3	3,940	3.5	3,990	3.8	3,760	2.1	3,851
Kerosine	333	—2.3	233	— 0.9	438	9.5	334	1.5	475	— 1.5	457
Distillate	2,021	5.6	1,270	4.1	2,215	7.3	1,880	5.8	2,685	0.4	2,447
Residual	1,717	1.2	1,345	1.1	1,740	1.0	1,629	1.1	1,895	— 1.9	1,816
Lubricants	159	0.6	160	1.3	161	2.5	160	1.3	154	— 0.6	158
Jet fuel	230	26.4	235	12.4	225	16.0	230	19.8	237		231
L.P.G.	442	—0.7	400	1.5	550	14.6	459	4.1	563	10.0	556
Other	984	36.7	1,030	5.6	772	—15.4	942	13.1	696	—26.2	735
Stock change	**39**		**479**		**—446**		**28**		**—580**		**—512**
Crude	85		25		—110		21		— 70		— 90
Products	—46		454		—336		7		—510		—422
New supply	**9,829**	**5.1**	**9,360**	**3.5**	**9,595**	**1.8**	**9,652**	**3.1**	**9,885**	**— 0.1**	**9,739**
Imports	**1,488**	**5.1**	**1,650**	**14.5**	**1,540**	**5.6**	**1,542**	**8.1**	**1,625**	**12.8**	**1,582**
Crude	910	2.3	1,200	15.1	1,000	9.1	1,006	7.7	1,000	23.8	1,000
Products	578	12.5	450	13.1	540	— 0.4	536	8.9	625	— 1.1	582
Production	**8,341**	**4.9**	**7,710**	**— 2.2**	**8,055**	**1.1**	**8,110**	**2.2**	**8,260**	**— 2.3**	**8,157**
Crude	7,525	5.0	6,900	— 3.0	7,200	0.5	7,286	1.9	7,400	— 2.9	7,299
Natural gasoline	816	4.1	810	4.9	855	5.8	824	4.7	860	3.2	858
Runs to stills	**8,007**	**1.3**	**7,975**	**— 0.4**	**8,200**	**3.5**	**8,047**	**1.4**	**8,360**	**2.7**	**8,279**

*First quarter actual, part of second quarter estimated, last half and first quarter of 1958 forecast.



Despite an out-of-focus picture in first half . . .

Production soars to an all-time high

ABNORMAL export demands, following the closing of the Suez Canal, helped boost domestic production to an all-time high in the first half of 1957. Several records were set:

. . . Production of crude and lease condensate averaged 7,525,000 bbl. daily for a gain of 359,000 bbl. daily or 5.0 per cent over the first half of 1956.

. . . Production for a single month passed 7,500,000 bbl. daily for the first time in February. Three out of the 5 months had averages above 7,500,000 bbl. daily.

. . . The all-time production peak was reached in February with an average of 7,717,000 bbl. daily.

. . . Thirteen states set new postwar first-half production records.

. . . Louisiana shifted into second place, ahead of California.

. . . Louisiana registered the largest increase over the first half of 1956.

The entire production picture is clouded by abnormal conditions, most of which developed sometime in 1956. Probably the most important factor was the closing of the Suez Canal on October 31, 1956. Pump stations on the Iraq Petroleum Co. pipeline were blown up 3 days later.

These two events caused a change in normal movement of about 2,000,000 bbl. daily of crude and products from the Middle East to Europe and the Western Hemisphere.

All available crude and fuel were shipped to Europe from the Gulf Coast of United States and from the Caribbean area. The remainder was made up by rerouting tankers around the Cape of Good Hope.

Crude states in this country had enough surplus productive capacity to cover a large part of the shortage, but transportation economics limited the use of some of this capacity. Some areas had no direct pipeline connection with tidewater points. Other areas had only limited pipeline capacity to export districts. Even with these handicaps, the Suez crisis caused increases in some inland producing states.

Some Rocky Mountain crude moved to the Mississippi River by pipeline and down to the Gulf Coast by barge. All available pipeline capacity to the Gulf Coast from West Texas and New Mexico was used. Since a large part of Louisiana's production is in the coastal districts, this state had a larger production increase than any other state.

Louisiana's production for the first half averaged 967,400 bbl. daily for a gain of 160,300 bbl. daily or 19.9 per cent. This increase, combined with a sharp drop in California, raised Louisiana to second place in the list of producing states. From the table, note that California's production has been decreasing since 1953.

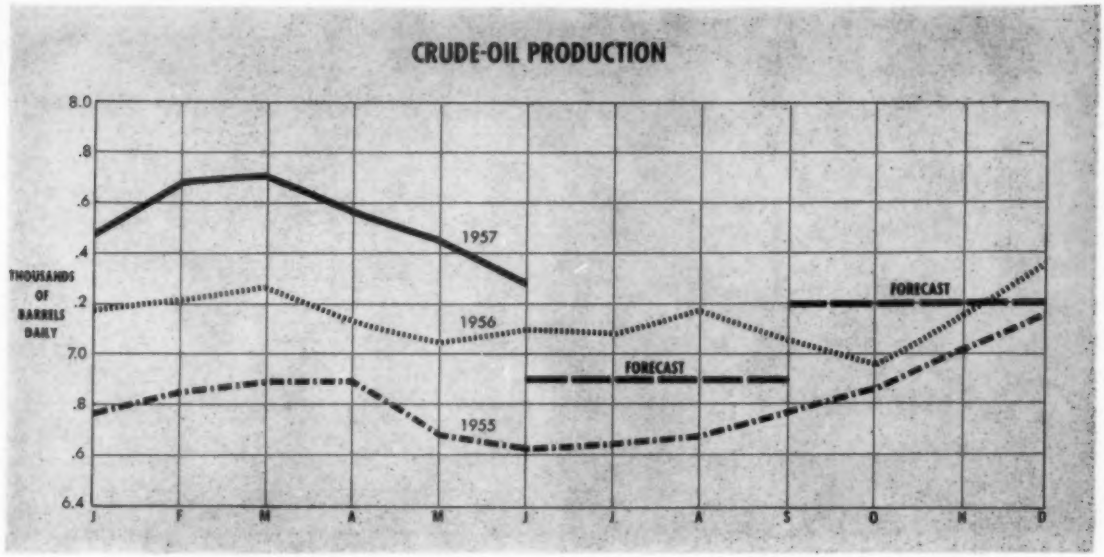
Texas Production Doubles in 10 Years

Texas crude increased 148,700 bbl. daily or 4.9 per cent over the first half of 1956. The table shows that Texas production increased a little more than a million barrels daily from 1947 to 1957.

Increased development work last year and better transportation facilities were important factors in the gains reported in many Rocky Mountain areas. Montana production was up 15,200 bbl. daily or 26.9 per cent. Nebraska showed a gain of 8,800 bbl. daily or 20.7 per cent. Wyoming reported an increase of 8,800 bbl. daily or 3.1 per cent more than last year. Utah's average of 10,200 bbl. daily more than doubled the output for the first 6 months of 1956.

New Mexico had a gain of 27,500 bbl. daily and Oklahoma was up 21,300 bbl. daily. New production in Alabama pushed the first-half average up 103 per cent over last year. Arkansas showed a gain of 7,800 bbl. daily to bring production back up to about the same level reported for 1950.

All of the data in the table tend to show that the larger volumetric gains were in areas near the coast.



Texas and Louisiana accounted for all but 50,000 bbl. daily of the total gain of 359,300 bbl. daily.

Actual production totals for the first quarter do not reflect demand for crude during the period. More than 11,000,000 bbl. of crude demand was supplied from inventories. This means that demand for crude was almost 125,000 bbl. daily more than production. This fact should be considered when comparing 1957 production with that of 1956. Production and demand were just about even in the first quarter of 1956.

For the second quarter this year, production was much larger than crude demand. The difference went to storage. Crude stocks increased a little more than 24,000,000 bbl. in the 3-month period ended June 30.

This big crude buildup in the second quarter will influence production in the last half of the year. Crude supply for the third quarter must be brought in line with demand. There is no need for further increases in crude stocks. Production and imports must be tailored to demand in the fourth quarter.

Since there will be no big export demand for crude in the first quarter of 1958, it will take a sharp reduction in imports for crude production to show a gain over 1957.

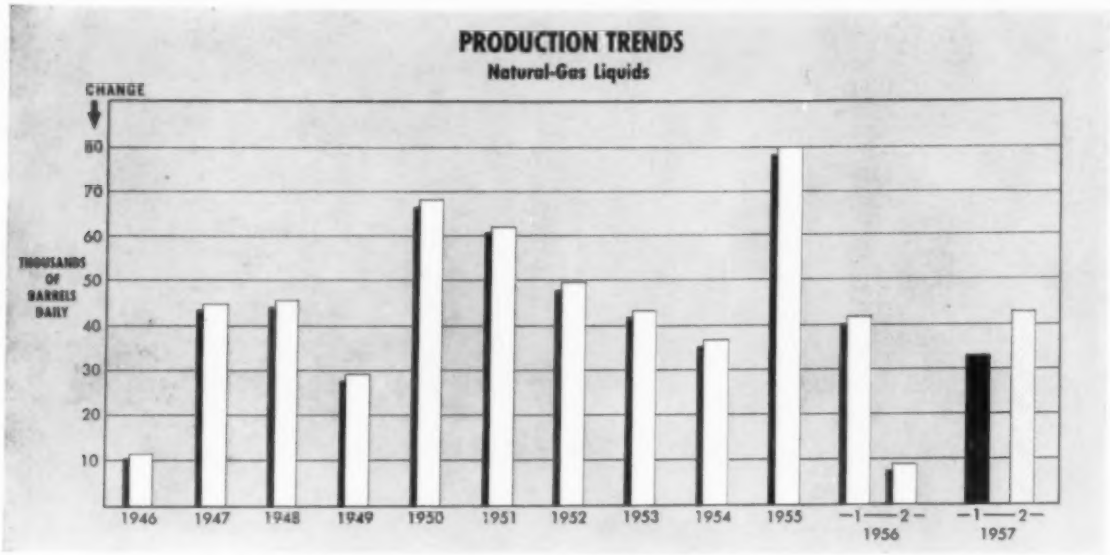
Total demand in the first quarter is estimated at 10,465,000 bbl. daily. About 565,000 bbl. daily will be supplied from inventories, leaving 9,900,000 bbl. daily new supply needed. Gas-liquids production will be near 870,000 bbl. daily. If crude production is near the 7,624,000 bbl. daily reported for the first quarter of 1957, a balance of 1,406,000 bbl. daily will be left for total imports.

Total imports averaged 1,441,000 bbl. daily this year and 1,423,000 bbl. daily in the first quarter of 1956. The total will have to be below 1,400,000 bbl. daily to give a crude production increase next spring.

United States Crude-Oil Production—First Half Year

(Thousands of barrels daily)

	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946
Alabama	12.6	6.2	3.7	4.5	4.7	2.7	2.8	1.6	1.2	1.3	1.0	1.1
Arkansas	85.9	78.1	78.0	81.4	81.0	80.2	81.7	85.8	84.8	85.7	80.2	77.0
California	932.0	966.7	971.2	989.4	998.1	980.0	964.9	866.6	938.2	940.2	903.6	854.8
Colorado	156.1	162.3	139.2	120.8	95.3	80.8	76.7	60.3	63.7	45.7	38.5	27.5
Florida	1.3	1.3	1.3	1.5	1.5	1.7	1.6	1.1	1.3	0.8	0.5	0.2
Illinois	214.4	225.5	218.7	177.7	160.7	164.1	166.3	169.4	175.5	174.0	185.9	208.5
Indiana	34.6	29.1	29.9	31.7	35.6	31.5	28.0	28.9	24.3	17.2	17.1	18.7
Kansas	334.4	341.2	331.8	328.7	328.9	296.4	309.4	286.2	288.0	297.1	280.7	257.6
Kentucky	46.0	48.0	40.5	37.2	30.6	34.4	29.0	26.5	23.2	24.1	25.3	29.7
Louisiana	967.4	807.1	725.3	707.0	708.5	645.6	632.9	547.3	520.8	483.0	424.1	379.7
Michigan	28.1	30.4	31.6	33.5	33.9	37.1	39.3	44.7	44.6	44.9	42.8	47.2
Mississippi	114.4	110.5	98.3	95.0	99.4	99.8	102.4	101.0	108.5	120.2	88.4	57.8
Montana	71.7	56.5	43.9	37.2	30.9	23.7	24.4	21.8	25.8	24.8	23.2	24.8
Nebraska	50.7	42.0	27.5	20.4	16.2	6.2	7.6	2.3	0.6	0.6	0.6	0.9
New Mexico	265.6	238.1	222.8	201.1	187.3	150.9	140.3	126.6	132.9	128.1	105.6	99.1
New York	7.5	7.5	8.1	9.1	10.7	11.7	11.6	11.5	12.3	12.7	13.0	13.4
North Dakota	37.6	35.9	27.1	14.5	14.6	1.2						
Ohio	13.7	12.6	11.5	11.0	9.4	9.0	8.8	9.3	9.6	9.5	8.1	8.0
Oklahoma	620.1	598.8	545.9	532.9	558.4	507.1	504.2	417.8	419.1	411.3	375.7	375.1
Pennsylvania	23.1	22.4	23.1	26.4	29.5	31.3	31.8	31.8	32.1	34.9	34.6	35.6
Texas	3,196.5	3,047.8	2,913.8	2,725.2	2,836.3	2,722.9	2,695.3	2,034.8	2,106.8	2,427.0	2,146.0	2,055.3
Utah	10.2	5.0	6.0	5.4	5.2	4.3	3.5	3.2	0.8			
West Virginia	6.0	6.0	6.5	8.2	7.5	7.1	7.5	7.9	7.5	7.2	6.9	8.3
Wyoming	294.8	286.0	267.1	252.5	213.5	175.4	190.2	159.8	127.1	145.9	116.1	105.6
Miscellaneous	0.4	0.5	0.5	0.4	0.2	0.2	0.2	0.2	0.3	0.2	0.4	0.2
Total United States	7,525.1	7,165.5	6,773.3	6,452.7	6,497.9	6,105.3	6,060.4	5,046.4	5,149.0	5,436.4	4,918.3	4,686.1



L.P.G. storage shows big gain

TOTAL PRODUCTION at natural-gasoline and cycling plants averaged almost 816,000 bbl. daily for the first half of 1957. This represents a gain of 4.2 per cent over the total for the first half of 1956 as reported by the Bureau of Mines.

The table shows a small decrease in total plant production in the last half of 1956 when compared with the revised figures for 1955. Even with the expected revisions for 1956, the gain will be only about 9,000 bbl. daily or 1.1. per cent.

The most outstanding feature of the light-products industry for the past year and a half has been the big gain in L.P.G. storage. Peak inventories of L.P.G. for 1955 came at the end of October, amounting to 475 million gallons at plants, terminals, and underground. The total climbed to 700 million gallons on October 31, 1956. The big increase normally comes after the end of May. Actual storage capacity may be a limiting factor this year since stocks had reached 692 million gallons by the end of May. Last year, L.P.G. stocks climbed 348 million gallons between May 31 and October 31. The same gain this year would push inventories above a billion gallons this fall.

PRODUCTION AT NATURAL-GASOLINE AND CYCLING PLANTS BY YEARS
(Thousands of barrels daily)

	L.P.G.‡	Natural gaso.‡	Other	Total	Per cent inc. Total	Per cent inc. L.P.G.
1943	59.4	138.0	42.9	240.3	5.3	17.6
1944	76.1	142.4	54.8	273.3	13.7	28.1
1945	84.8	170.4	51.7	306.9	12.3	11.4
1946	89.6	177.9	49.6	317.1	3.3	5.7
1947	120.8	181.6	59.7	362.1	14.2	34.8
1948	140.0	197.5	63.3	400.8	10.7	15.9
1949	155.2	199.7	75.5	430.4	7.4	10.9
1950	195.2	213.4	90.0	498.6	15.8	25.8
1951	232.4	234.1	94.5	561.0	12.5	19.1
1952	272.5	244.7	93.4	610.6	8.8	17.2
1953	301.4	256.4	95.8	653.6	7.0	10.6
1954	339.5	267.8	83.5	690.8	5.7	12.6
1955	389.6	290.7	90.5	770.8	11.6	14.8
1956:						
First half	407.3	288.0	87.4	782.7	4.2	8.6
Last half	412.3	293.7	83.1	789.1	—0.1	2.1
1957:						
First half*	435.6	292.4	87.6	815.6	4.2	6.9
Last half†	446.8	297.4	87.5	831.7	5.4	8.4

*Four months actual, two months estimated. †Forecast. ‡Isopentane included in natural gasoline, starting with 1945.

TOTAL PRODUCTION AT NATURAL-GASOLINE AND CYCLING PLANTS
(Thousands of barrels daily)

	1955 First half	1955 Last half	*1956 First half	*1956 Last half	1957 First half†
Pennsylvania	0.4	0.3	0.4	0.3	0.4
West Virginia	20.2	21.9	13.6	12.8	14.4
Ill., Mich., Ohio	21.4	24.3	23.4	25.0	25.9
Kenutcky	14.4	14.8	15.3	14.5	18.0
Kansas	14.4	13.2	13.6	12.0	15.5
Nebraska-N. Dakota	2.5	3.7	4.4	4.9	4.9
Oklahoma	63.2	69.5	71.1	69.8	67.5
Texas	409.9	429.9	424.8	433.0	451.4
Gulf	87.9	97.0	94.9	98.2	107.2
East Texas	29.4	27.6	25.8	26.2	25.7
Panhandle	60.2	63.2	66.4	63.6	68.5
West Texas	133.1	140.1	126.1	140.2	143.8
Rest of state	99.3	102.0	111.6	104.8	106.2
Arkansas	6.8	6.8	6.5	6.3	6.0
Louisiana	67.5	72.5	73.2	69.9	72.1
Gulf	30.1	35.8	37.4	37.9	39.0
Inland	37.4	36.7	35.8	32.0	33.1
Mississippi	2.4	2.1	2.3	2.3	2.4
New Mexico	33.7	36.7	36.8	40.2	42.0
Colo., Mont., Utah	4.4	4.9	(††)	(††)	(††)
Wyoming	5.5	5.7	13.1	14.8	14.5
California	84.5	83.9	84.2	83.3	80.6
Total U. S.	751.2	790.2	782.7	789.1	815.6

*Final figures will be adjusted upward by about 2,100 bbl. daily in West Texas and 8,100 bbl. daily in West Virginia, according to the Bureau of Mines. †Four months actual, 2 months estimated. ††Included with Wyoming.

A LONG Look Ahead

By JOHN C. CASPER — Economics Editor

PETROLEUM is becoming the pace setter of economic and industrial progress. It's also a barometer reflecting changes in the economic climate.

This trend is making forecasts of petroleum expansion in the future a valuable planning tool. They set markers by which gains in our standard of living can be measured.

The outlook for petroleum from now to 1965 is still one of dynamic growth, indicating our living standard will be moving up also. Here are some of the benchmarks for 1960 and 1965:

... **Demand.** Total demand in the United States for petroleum liquids—excluding exports—will climb to about 10,600,000 bbl. daily by 1960. It will reach 13,250,000 bbl. daily by 1965. Natural-gas requirements for 1960 will be 13.26 trillion cubic feet. They'll rise to 16.32 trillion for 1965.

... **Production.** Output of liquid petroleum will top 9 million barrels daily in 1960 and 10 million by 1963. The average will be 10,890,000 bbl. daily for 1965. At the same time the crude equivalent of natural-gas production seen for 1965 is 2,628,000,000 bbl. for the year.

... **Exploration.** Oil hunters in the industry will need to find 4.8 billion barrels of liquids in 1960 and 5.7 billion in 1965. These volumes will be needed to replace production and maintain reserves. The new gas needed will be equivalent to another 3.8 billion barrels of crude in 1965.

This exploration task is emphasized by this comparison: Total oil and gas found in 1956 equaled 7.9 billion barrels of crude. But discoveries must equal 9.5 billion barrels to meet needs in 1965.

... **Drilling.** Operators drilled 58,160 wells to find oil and gas in 1956. They'll have to step this up to 82,300 wells in 1965 to meet discovery needs.

Because wells are getting deeper, footage will increase faster than the number of wells drilled. Depth of the average well for 1965 will slightly exceed 4,600 ft.

... **Processing.** Production of liquids at natural-gasoline and cycling plants is expected to exceed 21 billion gallons for 1965. That's 1,420,000 bbl. daily.

Refinery runs of 11,200,000 bbl. daily will be needed to balance the demand forecast. But changes in processing will be a more important factor than increased throughput.

... **Pipelining.** The increases forecast for natural-gas demand call for about four major gas lines a year. Pipeline movement of gasoline, kerosine, and distillate may reach 51 per cent of their demand by 1965.

THIS IS THE BROAD PICTURE . . . FOR DETAILS

SEE NEXT 15 PAGES →

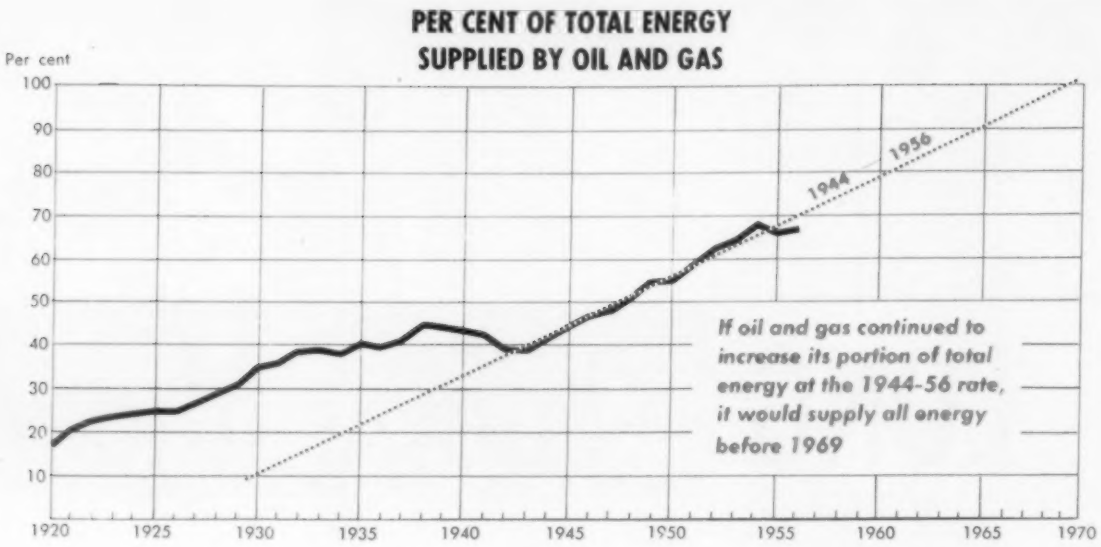


FIG. 1.

"Energy outlook key to oil's economic role"

FEW PERSONS even in the oil industry realize the staggering demands that the future will make on their industry. Some serious students now doubt that the oil industry can physically maintain its present growth rate through this century.

This doesn't mean that the nation will run out of oil or that the oil industry will begin shrinking. It does mean there may be a physical limit down the road to the amount of energy the nation can expect oil to supply.

The energy outlook is important. It's the key to oil's future economic role. In fact, the industrial and economic growth of this country is related directly to the over-all increase in consumption of energy.

In the past, use of energy has grown faster than our population. This reflects the tendency of Americans to shift more and more of the work load to forms of energy other than human brawn.

Statistics reveal that vividly. Population growth in this country since the beginning of the century has averaged 1.44 per cent a year. Energy consumption has gained at the rate of 2.8 per cent a year. This spiraling energy use has meant better things for more people.

Big role for oil . . . Petroleum has been the great contributor to this improved way of life.

By 1920 petroleum and natural gas accounted for about 17.7 per cent of all energy fuels used in this country. In 1956 the energy supplied by oil and gas had climbed to 67.5 per cent of total energy.

This leads to a startling conclusion: The astounding rate of gain in petroleum demand that has existed in this country for many years can not be maintained.

Here's why:

For the period 1940 through 1956, this country's demand for oil and gas increased at the average rate of 6.1 per cent a year. For 1956, domestic demand for petroleum liquids averaged 8,756,000 bbl. daily. The crude equivalent of marketed production of natural gas that year was 4,609,000 bbl. daily. (Gas was converted to crude equivalent at the rate of 6,000 M.c.f. of gas per barrel of oil.)

This made total demand for oil and gas in 1956 13,365,000 bbl. daily. At this same rate of increase, 6.1 per cent a year, demand in 1970 would reach 30,870,000 bbl. daily or 11.25 billion barrels for the year.

If the calculation is extended to the year 2000 with the same rate of increase, oil and gas demand would average 185,600,000 bbl. daily or 67.9 billion barrels for the year.

Assume that half of the total is liquid and the other half gas. This would call for transportation for about 93,000,000 bbl. daily of crude liquid to the processing plant and almost the same amount of products from plants to customers.

Even with pipelines large enough to transport a million barrels of crude daily, it would take 93 trunk lines of this size to get the crude to refineries. It would take even more lines for the gas. With individual line capacity of a billion cubic feet daily, a total of about 560 of these big trunk lines would be needed to move the natural gas.

Some changes due . . . Still other facets of the problem show that petroleum demand can not continue to increase at the rate it has enjoyed for the past 10 or 15 years.

Oil and gas in 1956 represented about 67.5 per cent of total energy fuels used in this country. As shown in Fig. 1, if oil and gas continue to gain in the total energy picture at the same rate, they will account for all energy consumed sometime about 1969.

Either the rate of gain in total energy consumption will have to increase or the rapid advance by oil and gas will have to slow down.

Complete figures are not available to show what form of energy is replaced by another form. The data do show definitely that oil and gas demands have made

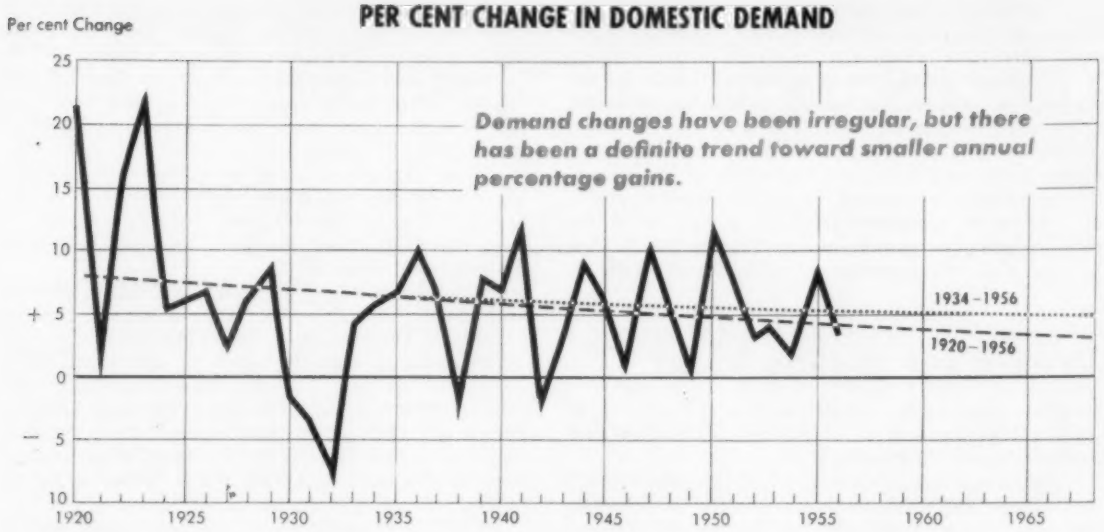


FIG. 2.

gains at times when use of other forms of energy was declining.

For the period of this forecast—through 1965—the rate of gain will not drop as low as the rate of gain in total energy consumption. But it will be less than the average petroleum rate for the 1944-56 period. At the same time annual volumetric increases in demand will be larger than in the middle '50s.

The rate of increase in demand for petroleum products actually has a downward trend (Fig. 2). For the period from 1920 through 1956, the trend line had a very definite downward slope. Even for the period from 1934 through 1956, there is a tendency toward lower percentage increases even though the decline for the period seems to be slightly less than for the longer period.

The plotted points on Fig. 2 represent percentage changes in total domestic demand for petroleum products each year since 1920. That was soon after the first good figures were available on a national basis.

Except for the depression years of 1930 through 1932, there were only 2 years when actual decreases were reported in domestic demand. These losses were in 1938 and again in the restricted-consumption year of 1942.

Actual demand trends since 1940 are shown in Table 1. Note that total demand for liquids topped 9 million barrels daily for the first time in 1956. The continuing gains will put it above 10 million barrels daily by 1960 and to 13½ million barrels by 1965.

Demand data for past years are from the Bureau of Mines. The forecasts are based on product demand trends and probable economic climate for the period through 1965.

What demand means . . . All forecasting for segments of the oil industry must start with demand. It's academic that consumption of oil and gas is a prime determinant of future growth in drilling, producing, refining, and transportation.

The outlook for demand is this: Total need for oil and gas is expected to climb to almost 17 million barrels daily by 1960. It'll keep climbing to 20.9 million barrels daily by 1965.

A few words of explanation are necessary for better understanding of these demand totals. The totals for oil and gas are combined when related to the need for drilling because they are so closely related in use and source. Natural-gas demand and production are thus expressed as a crude equivalent of 6,000 cu. ft. to a barrel of crude or average products. The total demand also includes exports. This factor will decline since crude and product exports are expected to drop to about 200,000 bbl. daily by 1965.

The forecast totals also are based on a few fundamental assumptions:

. . . The over-all national economy is expected to continue its normal expansion without any major depression.

. . . A period of peace will exist. No allowance is made to cover extra petroleum requirements for another world war.

TABLE 1—DEMAND TRENDS
(Thousands of barrels daily)

	Liquid petroleum			Natural gas consumption and loss*	Total oil and gas
	Domestic demand	Export demand	Total demand		
1940	3,625	356	3,981	1,510	5,491
1941	4,071	298	4,369	1,572	5,941
1942	3,972	320	4,292	1,680	5,972
1943	4,168	411	4,579	1,872	6,451
1944	4,566	567	5,133	2,150	7,283
1945	4,857	501	5,358	2,199	7,557
1946	4,912	419	5,331	2,344	7,675
1947	5,452	450	5,902	2,580	8,482
1948	5,775	368	6,143	2,713	8,856
1949	5,803	327	6,130	2,864	8,994
1950	6,507	305	6,812	3,234	10,046
1951	7,053	422	7,475	3,767	11,242
1952	7,280	432	7,712	4,036	11,748
1953	7,604	401	8,005	4,204	12,209
1954	7,760	355	8,115	4,322	12,437
1955	8,460	368	8,828	4,648	13,476
1956	8,757	429	9,186	4,973	14,159
		Forecast			
1957	9,067	557	9,624	5,200	14,824
1958	9,650	320	9,970	5,510	15,480
1959	10,120	310	10,430	5,780	16,210
1960	10,600	300	10,900	6,040	16,940
1965	13,250	200	13,450	7,450	20,900

*Expressed as crude equivalent in thousands of barrels daily. (6,000 cu. ft. of gas equals 1 bbl. of crude.)

... **Petroleum and gas will replace other forms** of energy at a slower rate than they have since the early '40s.

... **Atomic energy** on a commercial scale is not expected to increase fast enough to be a major factor in the energy-replacement race by 1965.

The history of oil demand shows that petroleum consumption does not drop off as much as other items during periods of adjustment for either mild or severe changes in the economy. However, a big dip in the over-all economic growth of this country would tend to slow down the expansion of petroleum demand.

Where's it coming from?

What sources of supply can the industry tap to meet a 1960 demand of 17 million barrels daily and a 1965 need for 20.9 million?

Natural-gas demand will be supplied from domestic production. The exceptions are relatively small quantities of gas to be imported from Canada and Mexico, starting at least by 1958.

Announced gas-import plans account for a little more than 150 billion cubic feet for 1958, climbing to about 300 billion for 1960. Growth over the following 5 years will raise gas imports to slightly more than 500 billion cubic feet by 1965. Trends after that will depend on the supply positions of Canada, Mexico, and this country.

Natural-gas consumption and loss is forecast at 16.32 trillion cubic feet for 1965. If 550 billion of this is supplied by gas imports, required domestic production will total 15.77 trillion. The crude equivalent of this total is 2,628,000,000 bbl. for the year (Table 2).

This means that gas production for 1965 will have a heat value that is greater than that of total crude production for 1956.

Supplying the crude ... At least for the next few years, demand for liquid-petroleum products will be supplied from a combination of three sources: Domestic crude, liquids stripped from natural gas, and imports.

Liquid fuels from shale, coal, or the tar sands will become factors in the supply program only when they can be delivered to important market areas at prices competitive with products from crude.

Some commercial sales of products from shale oils can be expected before 1965, latest date in this forecast. The volume of sales probably will not be large enough to change materially the trend in demand for petroleum products.

So total new supply of liquids in 1960 is expected to average 10,940,000 bbl. daily. It should climb to 13,500,000 bbl. daily by 1965 (Table 3).

Estimates of required supply of petroleum liquids are derived by adding to total demand enough to take care of increased stocks. For those who keep complete records of trends in inventory changes, those additions may seem a little large. They are based on an assumption that additional terminals will be added to the list of those reporting to the Bureau of Mines.

Again in breaking down the new supply into its three components of imports, gas liquids, and domestic crude, individual assumptions were made. These include:

... **Imports will slow down** over the next few years. The amounts may grow but the per cent of total new supply represented by imports will increase at a slower pace. This will be achieved either by direct governmental action or government-sponsored limitations carried out by individual importers.

Imports of crude and products have accounted for an increasingly larger portion of total new supply of liquids since 1942, the low point in World War II. This ratio (Fig. 3) climbed from less than 3 per cent in 1942 to more than 15 per cent in 1956.

The period ahead of slower gains in imports probably will last until sometime between 1960 and 1965. If crude continues to be increasingly difficult to find in this country, the ratio may start climbing again

TABLE 2—SUPPLY TRENDS—NATURAL GAS
(Billions of cubic feet)

	Consumption and loss	Imports	Production	Production-crude equivalent*
1940	3,316	.....	3,316	553
1941	3,443	.....	3,443	574
1942	3,680	.....	3,680	613
1943	4,099	.....	4,099	683
1944	4,721	.....	4,721	787
1945	4,815	.....	4,815	803
1946	5,132	.....	5,132	856
1947	5,650	.....	5,650	942
1948	5,958	.....	5,958	993
1949	6,273	.....	6,273	1,046
1950	7,083	.....	7,083	1,181
1951	8,250	.....	8,250	1,375
1952	8,862	.....	8,862	1,477
1953	9,207	.....	9,207	1,535
1954	9,466	.....	9,466	1,578
1955	10,179	.....	10,179	1,697
1956	10,921	.....	10,921	1,820
	Forecast			
1957	11,388	.....	11,388	1,898
1958	12,070	156	11,914	1,986
1959	12,660	265	12,395	2,066
1960	13,260	304	12,956	2,159
1965	16,320	550	15,770	2,628

*Crude equivalent in millions of barrels per year (6,000 cu. ft. of gas equals 1 bbl. of crude).

TABLE 3—SUPPLY TRENDS—LIQUIDS
(Thousands of barrels daily)

	Production			Total imports	Total new supply	Total stock change
	Crude	Gas liquids	Total			
1940	3,697	161	3,858	229	4,087	106
1941	3,842	231	4,073	266	4,339	—30
1942	3,799	235	4,034	98	4,132	—160
1943	4,125	247	4,372	174	4,546	—33
1944	4,584	280	4,864	252	5,116	—17
1945	4,695	315	5,010	311	5,321	—37
1946	4,750	323	5,073	377	5,450	119
1947	5,088	364	5,452	436	5,888	—14
1948	5,520	402	5,922	514	6,436	293
1949	5,046	431	5,477	646	6,123	—7
1950	5,407	499	5,906	850	6,756	—56
1951	6,158	562	6,720	844	7,564	89
1952	6,256	612	6,868	952	7,820	108
1953	6,458	655	7,113	1,034	8,147	142
1954	6,342	692	7,034	1,052	8,086	—29
1955	6,807	772	7,579	1,248	8,827	0
1956	7,152	787	7,939	1,426	9,365	179
	Forecast					
1957	7,286	824	8,110	1,542	9,652	28
1958	7,600	890	8,490	1,530	10,020	50
1959	7,900	960	8,860	1,620	10,480	50
1960	8,180	1,040	9,220	1,720	10,940	40
1965	9,470	1,420	10,890	2,610	13,500	50

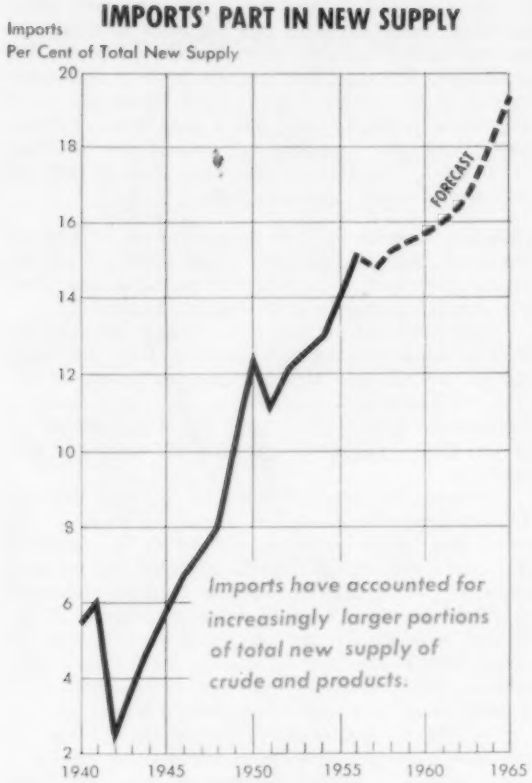


FIG. 3.

before 1965. Total imports then are expected to be a little more than 19 per cent of total supply. This is not a recommendation but a projection of what seems likely to happen within the next 10 years.

... Gas liquids will increase both in volume and in severity of recovery.

Total gas-liquid production averaged 787,000 bbl. daily in 1956. It is expected to top a million barrels daily for the first time in 1960 and to increase to 1,420,000 by 1965. This means larger volumes of gas will be processed at natural-gasoline and cycling plants and also higher recovery of liquids from the gas stream.

Actually this total for 1965 may be too low if petrochemical users start stripping large amounts of ethane from the gas stream. Such a change would represent an increase in total liquid production which in turn would indicate an increase in total demand.

... Domestic crude production, largest item of total supply, likely will hit 8 million barrels daily about 1960 and top 9 million by 1963. The forecast total for 1965 is 9,470,000 bbl. daily.

Larger basic reserves needed

Oil men in order to meet ever-increasing demand for domestic liquids will have to maintain larger basic reserves.

Trends in recent years, however, seem to indicate the growth in reserves will not have to be directly proportional to the increase in production. In fact in recent years the ratios of reserves to production have been declining (Figs. 4, 5, and 6).

The postwar trend for crude reserve-production ratios shows only a very mild decline for the period. Part of this was due to very high demands for and production of crude in 1948-49. For at least part of 1948 most of the wells in the country were producing at their maximum efficient rate. Reserves took a big jump in 1949 when production went down. Probably a more typical period is shown by the records for 1950-56, shown by a solid line on Fig. 4.

The growth in natural-gas consumption has paralleled construction of large-diameter pipelines. Production thus has been growing faster than reserves (Fig. 5) or ratio of reserves to production declining. The same is true for natural-gas liquids (Fig. 6).

This can be carried to ridiculous lengths, however. For instance, to say the oil and gas industry over an extended period can get along each year with a smaller volume in reserve for each barrel produced could be carried to its illogical conclusion.

This is the general picture of relationships between reserves and production expected through 1965

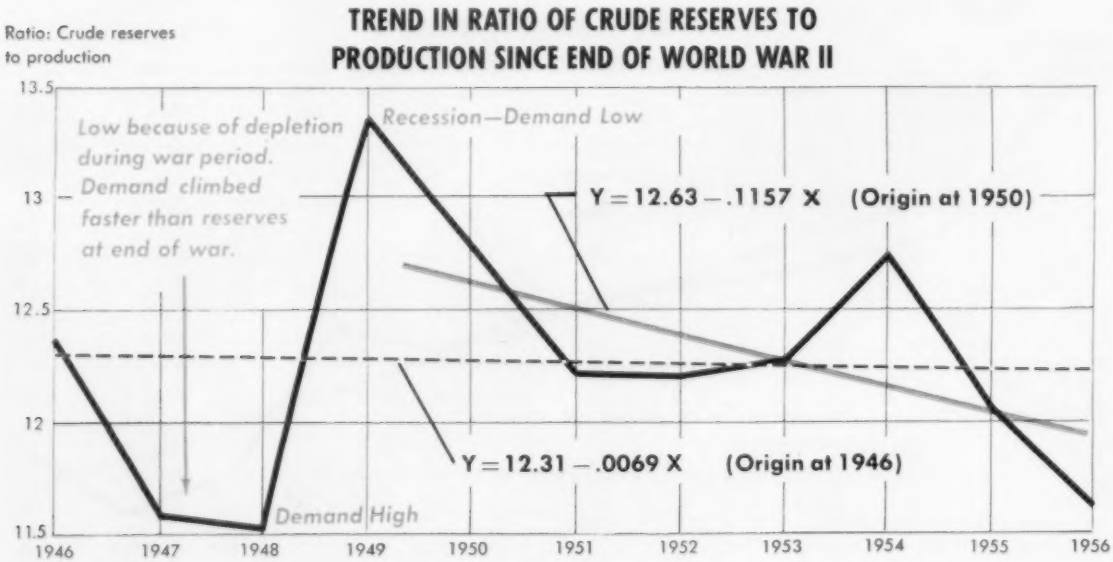


FIG. 4.

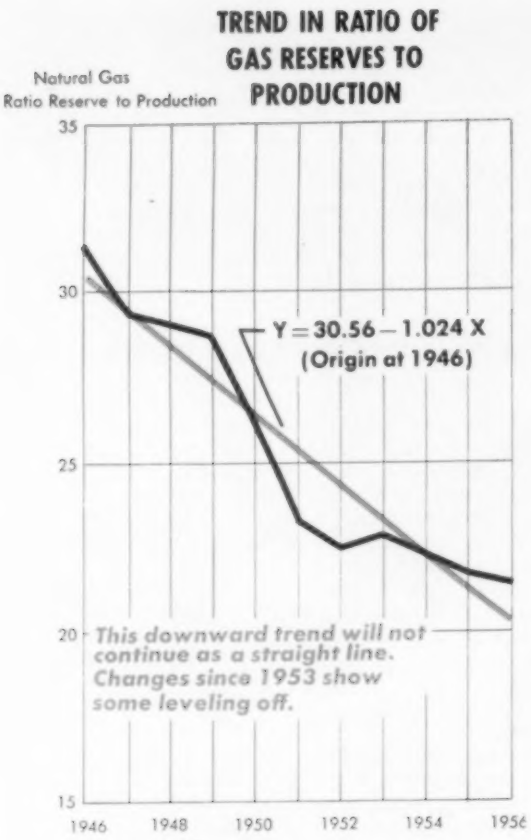


FIG. 5.

(Fig 7): There will be a continuing decline in the amount of oil and gas reserves needed to back up each barrel of production. The amount of decline, however, tends to become smaller. Considering past information on the curve and probably conditions of production in the future, the ratio of combined crude, gas, and gas liquids probably will not drop below 14.

Operators will have to maintain at least 14 bbl.—or the equivalent in the case of gas—for each barrel produced. Note that this limiting ratio is above the current ratio of reserves to production of crude. The explanation in this: The over-all total is influenced by natural gas and gas liquids. Much of the gas is and will continue to be sold under long-term contracts, many based on guaranteed production for as much as 20 years. This plan of marketing tends to keep the reserve-production ratio very high.

Changing formula . . . If production of oil and gas remained static, all operators would need to find only enough petroleum to replace that produced each year. But demand changes and so does production.

When production increases, enough oil and gas must be found to offset that produced. Even this would call for a small gain in the amount of petroleum that must be found each year. But a still larger factor in the increase is this: In a given year there should not be too great a change in the ratio of reserves to production.

Assume that production of oil and gas increases 5.0 per cent a year. In the discussion above it was stated that the over-all ratio of reserves to production (for crude, gas, and gas liquids) probably will not drop below 14. This means that reserves must be maintained at a level that is at least 14 times production. If production is raised 5.0 per cent, then reserves must be raised 5 per cent. But, if reserves are 14 times production, then the addition to reserves will have to be 5 times 14 or 70 per cent of production for the year.

So, the oil hunter must replace the oil and gas produced, 100 per cent of production for the year, and also add to reserves an amount equal to 70 per cent of production.

Thus, for a gain of 5.0 per cent in production of oil and gas, the oil man must find 1.7 bbl. of oil and gas for every barrel produced. (Gas production and reserves would be expressed as crude equivalent.)

For the actual forecast of reserves and additions to reserves, total production is broken down into liquids and gas. First, note that additions to reserves of liquids were below normal for the years 1954, 1955, and 1956. These additions will have to be larger if anything like normal ratios of reserves to production are maintained.

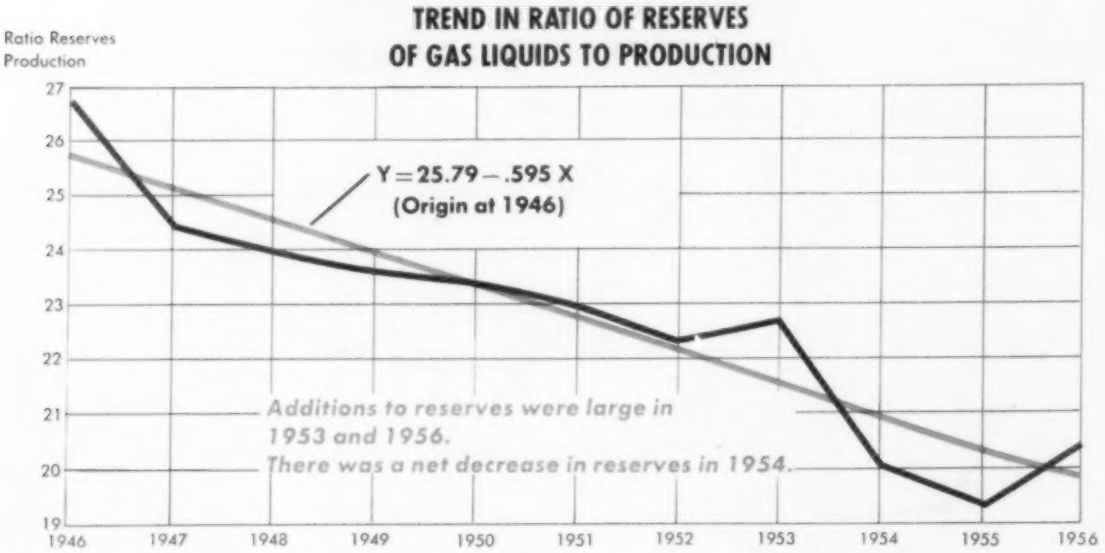


FIG. 6.

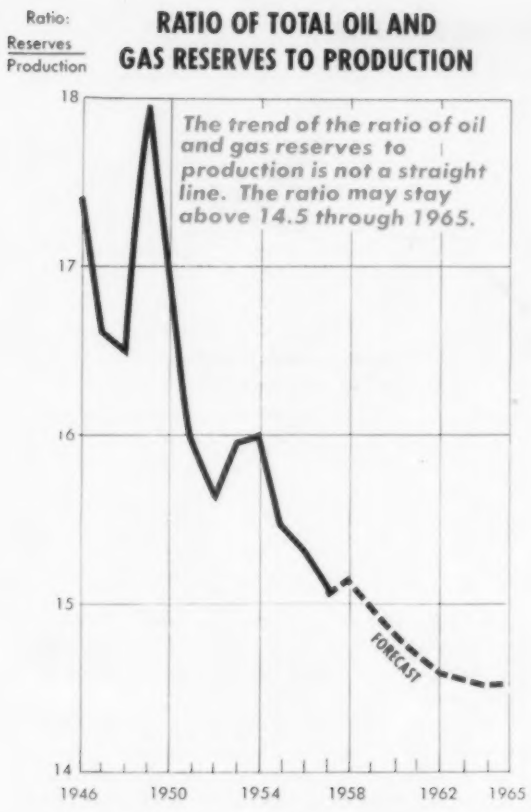


FIG. 7.

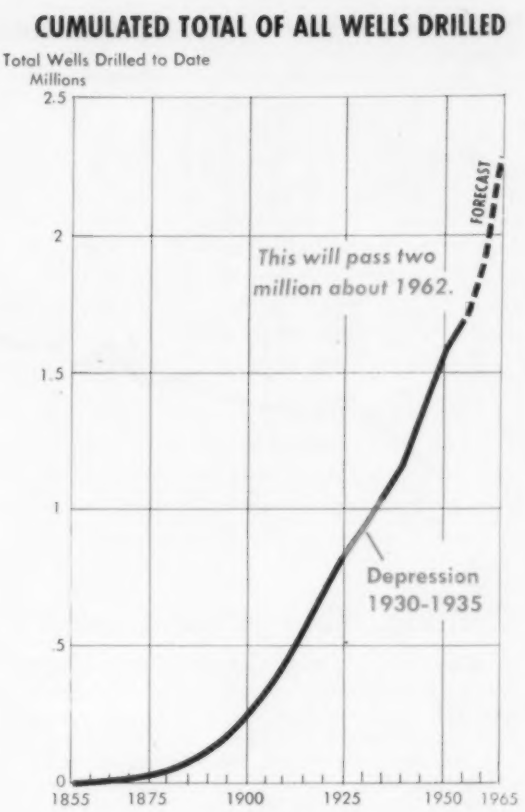


FIG. 8.

Total liquids needed for production and additions to reserves in 1957 add to 4.1 billion barrels or almost up to the best year in the past, 1948. Total gas needed is equivalent to almost 3.0 billion barrels of crude for an over-all total of a little better than 7.0 billion barrels.

The needed total climbs to 8.0 billion by 1960 and to 9.5 billion by 1965 (Table 5).

The volumes of oil and gas found in the past compared with total drilling for each year since 1940 are shown in Table 5. Calculated volumes of oil and gas found per well are included to show past trends.

In this forecast, total oil found includes the volume credited by A.P.I. and A.G.A. to new fields and new pays plus revisions and additions to fields and pays discovered in past years. The comparison is made with total wells drilled since development drilling accounts for at least a part of the upward revisions for old fields.

TABLE 4—PRODUCTION AND ADDITIONS TO RESERVES
(Millions of barrels per year)

	Total liquids			Gas		
	Production	Added to reserves	Total found	Production	Added to reserves	Total found
1940	1,412	542	1,954	553	2,500	3,053
1941	1,487	565	2,052	574	2,800	3,374
1942	1,472	493	1,965	613	1,367	1,980
1943	1,596	—19	1,577	683	1,500	2,183
1944	1,780	389	2,169	787	2,417	3,204
1945	1,829	374	2,203	803	1,798	2,601
1946	1,852	932	2,784	856	2,131	2,987
1947	1,990	705	2,695	942	892	1,834
1948	2,167	2,080	4,247	993	1,324	2,317
1949	1,999	1,557	3,556	1,046	1,085	2,131
1950	2,156	1,158	3,314	1,181	869	2,050
1951	2,453	2,658	5,111	1,375	1,370	2,745
1952	2,514	765	3,279	1,477	984	2,461
1953	2,596	1,425	4,021	1,535	1,955	3,490
1954	2,568	422	2,990	1,578	44	1,622
1955	2,766	646	3,412	1,697	1,998	3,695
1956	2,906	886	3,792	1,820	2,346	4,166
		Forecast				
1957	2.960	1,170	4,130	1,898	1,050	2,948
1958	3,099	1,289	4,388	1,986	1,150	3,136
1959	3,234	1,339	4,573	2,066	1,150	3,216
1960	3,375	1,410	4,785	2,159	1,150	3,309
1965	3,975	1,750	5,725	2,628	1,200	3,828

TABLE 5—DISCOVERIES AND DRILLING
(Discoveries in millions of barrels)

	Oil found	Gas found	Oil and gas found	Total wells drilled	Oil and gas found per well*
1940	1,954	3,053	5,007	30,040	166,680
1941	2,052	3,374	5,426	32,140	168,820
1942	1,965	1,980	3,945	18,150	217,360
1943	1,577	2,183	3,760	19,477	193,050
1944	2,169	3,204	5,373	25,262	212,690
1945	2,203	2,601	4,804	26,879	178,730
1946	2,784	2,987	5,771	29,229	197,440
1947	2,695	1,834	4,529	33,122	136,740
1948	4,247	2,317	6,564	39,778	165,020
1949	3,556	2,131	5,687	39,038	145,680
1950	3,314	2,050	5,364	43,279	123,940
1951	5,111	2,745	7,856	44,516	176,480
1952	3,279	2,461	5,740	45,821	125,270
1953	4,021	3,490	7,511	49,279	152,420
1954	2,990	1,622	4,612	53,930	85,520
1955	3,412	3,695	7,107	56,682	125,380
1956	3,792	4,166	7,958	58,160	136,830
	Projected Need for Drilling				
1957	4,130	2,948	7,078	59,000	120,000
1958	4,388	3,136	7,524	62,700	120,000
1959	4,573	3,216	7,789	66,000	118,000
1960	4,785	3,309	8,094	69,200	117,000
1965	5,725	3,828	9,553	82,300	116,000

*Barrels per well, crude equivalent.

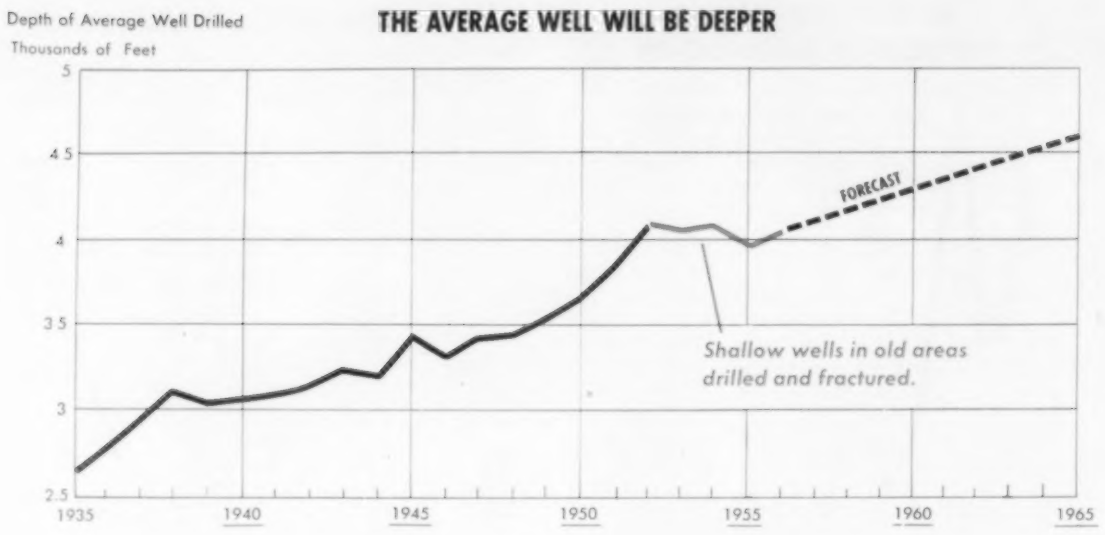


FIG. 9.

Drilling story is complex

Now let's take a look at what's ahead for drilling.

Again the forecast of wells for 1957 is based on need for ever-increasing reserves and not on actual reports from drilling companies. This total, therefore, may not correspond to the midyear projection at the first of this section. That forecast is based on answers to drilling questionnaires by a large sample of operators.

By the end of 1956, oil men had drilled 1,648,000 wells in this country. They had discovered roughly 165 billion barrels of oil and gas.

This forecast shows a need for finding 75.6 billion more in the 9-year period until the end of 1965. This will require drilling more than 645,000 wells in the 1957-65 period. In other words, drillers in this country will have to drill in 9 years almost 40 per cent as many wells as were drilled from the Drake well through 1956. Fig. 8 shows wells drilled to date and the forecast for 1960 and 1965.

Actually, the job is bigger than that. The total of 645,000 wells doesn't tell the story of increasing depth. The average well drilled has had a definite trend toward greater depths (Fig. 9).

Fracturing has been a big factor in the break in the trend for the past few years. Many marginal locations in older shallow areas were not drilled when the fields were developed because of the long payout period. Fracturing cut the time of payout, and operators moved in and drilled these wells.

Fig. 10 shows that there has been a close correlation between total footage drilled each year and the value at the well of all oil and gas produced that year. Value totals are corrected for changes in the value of the dollar and are expressed in 1956 dollars.

If these past relationships hold, oil and gas production in 1965 must be worth between 14 and 15 billion dollars at the well in 1956 dollars if operators are to drill 380,000,000 ft. of hole.

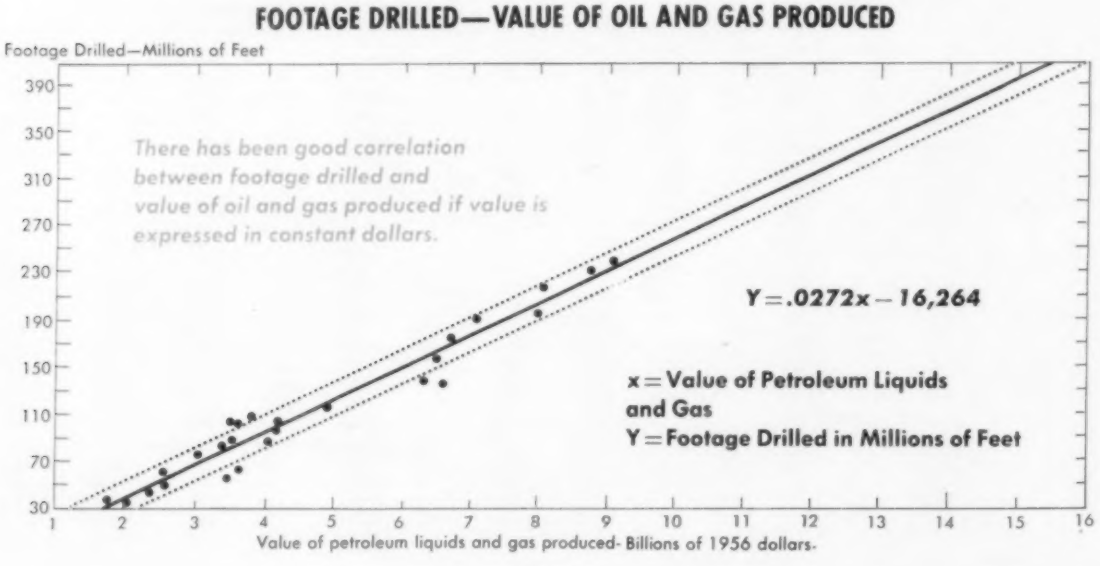


FIG. 10.

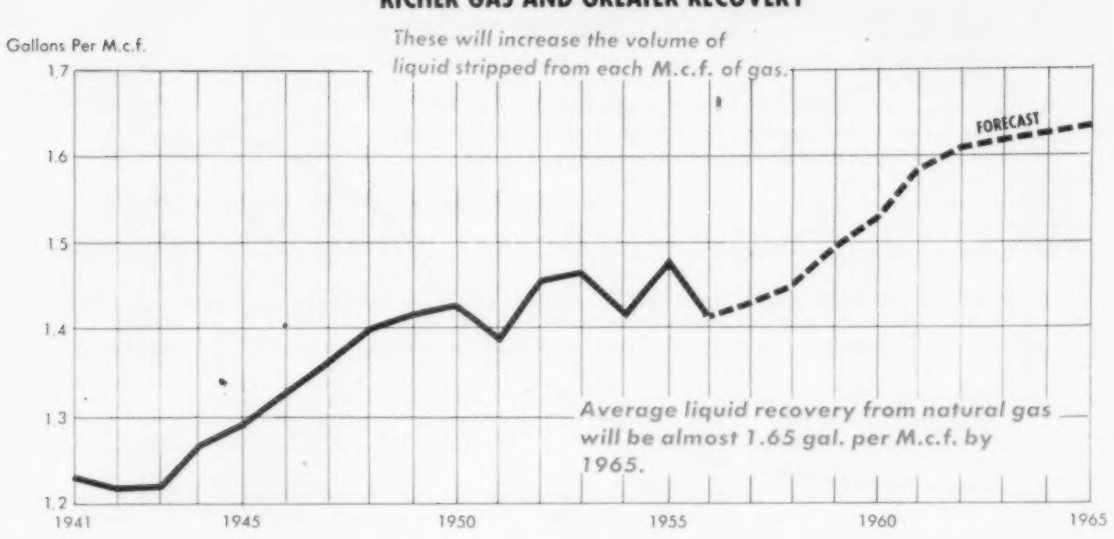


FIG. 11.

Sharp changes due in field processing

This segment of the oil industry has undergone some rapid and startling changes in the last few years. More are ahead.

Most of the gain in liquids stripped from a unit of natural gas since the start of World War II has been due to deeper recovery of propane. Greater demand for L.P.G. for heating and cooking created a market for larger quantities of this fuel.

The demand was met by handling larger volumes of gas by recovering a higher percentage of the liquids from each unit of gas. Higher demands in the future will have to be met by variations of the same process.

It costs more per gallon to recover higher percentages of the propane in natural gas. Increased efficiency of operation has lowered the cost, but large volumes of propane are still traveling in the gas stream because it would cost more to recover the liquid than it would sell for at the plant.

More and more of the propane will be stripped when prices at the plant are high enough to pay a profit over and above the extra cost.

This means that output gains for L.P.G. in the future will be based on three factors:

. . . **Recovery of a higher percentage** of liquid from the gas.

. . . **Increase in volume** of gas processed.

. . . **Trend toward richer gas.**

There are several factors influencing the higher percentage recovery of liquids. All are related to the one big condition: The liquid will have to sell for a price that will make recovery profitable.

Role of pipelines . . . Increased delivery of L.P.G. by pipeline will promote greater propane recovery.

One of the big stumbling blocks in broad distribution of L.P.G. has been the high cost of transportation. Lower delivery costs will open up new markets. These same lower costs can mean higher prices paid to the plant operator. And, higher plant prices will make it possible for the operator to strip a larger portion of the propane.

Increased use of pipelines for delivery of L.P.G. must be tied to increased development of underground storage near points of consumption. Early programs of expanding underground storage centered for the most part in the Southwest near the big producing areas. This extra storage helped maintain a more even production schedule at plants during the summer months.

A combination of pipeline delivery and further construction of underground storage near distribution points will make it possible for L.P.G. suppliers and distributors to follow a definite plan for a full year's program.

Greater wintertime supply and full-year availability at all distribution points will add new customers in the transportation field.

Increased demand for ethane as a base for petrochemical processing may add some large plants near the distribution ends of major gas pipelines. These low-temperature plants will produce some propane and butane along with the ethane.

Recovery climbs . . . The volume of liquids stripped from the average M.c.f. of natural gas has gained remarkably in the last 15 years.

Recovery was slightly less than 1.25 gal. per M.c.f. in 1941. Chart 11 shows the volume of liquids stripped since then when full reporting was started by the Bureau of Mines. The climb in recovery was sharp and steady from 1943 through 1950. Forecast for the future shows a good increase with the curve tending to level off a little by 1965.

Total liquids produced at natural-gasoline and cycling plants in 1965 is forecast at 21.8 billion gallons or 1,420,000 bbl. daily. This average represents a gain of a little beter than 80 per cent over production reported for 1956.

Table 6 shows gross production of natural gas, the amount processed at plants, the total amount of

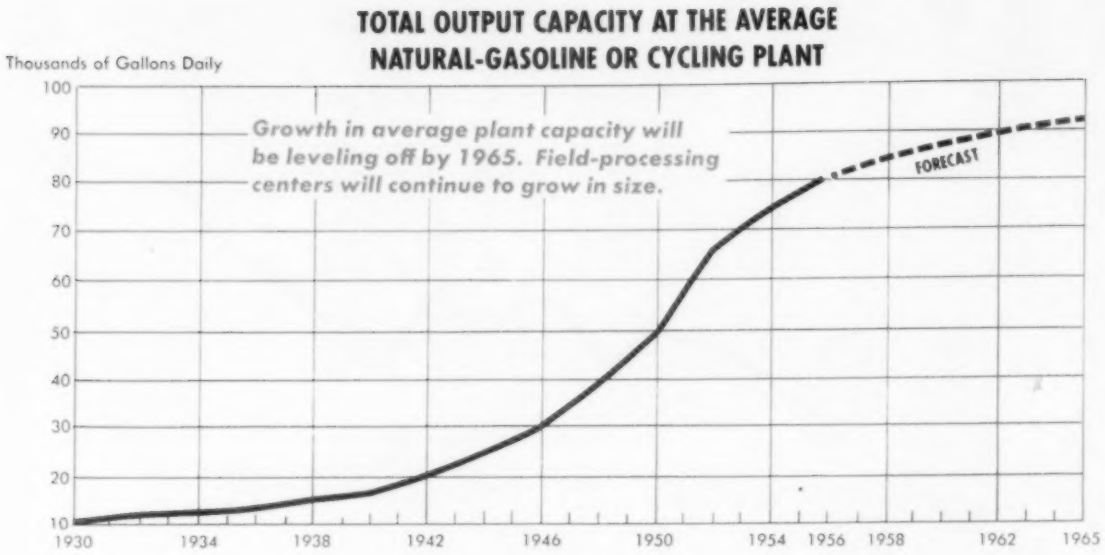


FIG. 12.

liquids produced, and the volume of liquid from each M.c.f. of natural.

The plants . . . Size of the average field-processing plant has been increasing for more than 20 years. A large part of the increase has come since the start of World War II.

The average plant in 1930 produced only about 10,000 gal. daily. Capacity was up about 80,000 gal. daily by the end of 1956.

Fig. 12 shows this growth in capacity of the average plant with a projection of this growth to 1965. By that time plants are expected to average a little more than 90,000 gal. daily.

The more important changes in field-processing plants probably will be related to the shifts in processing the heavier fractions. These changes will include:

. . . Addition of isomerization units at larger plants or at central locations in areas of small plants.

. . . Greater use of superfractionation units to meet demand for close-specification products.

. . . Greater use of pipelines for transporting unfractionated streams to central locations for separation and further processing.

Product trends . . . The nature of products coming from field-processing plants has been changing radically for some time.

Straight natural gasoline has lost much of its value as a gasoline-blending agent. Even regular motor gasoline now has high-octane quality. Use of natural gasoline for volatility requires the use of larger quantities of costly blending stocks to bring the over-all blend up to specifications for regular gasoline.

Fig. 13 shows what this trend has done to the average spot price of Grade 26-70 natural on the Group 3 market. If actual spot prices are corrected for inflation, the result gives a truer comparison of actual

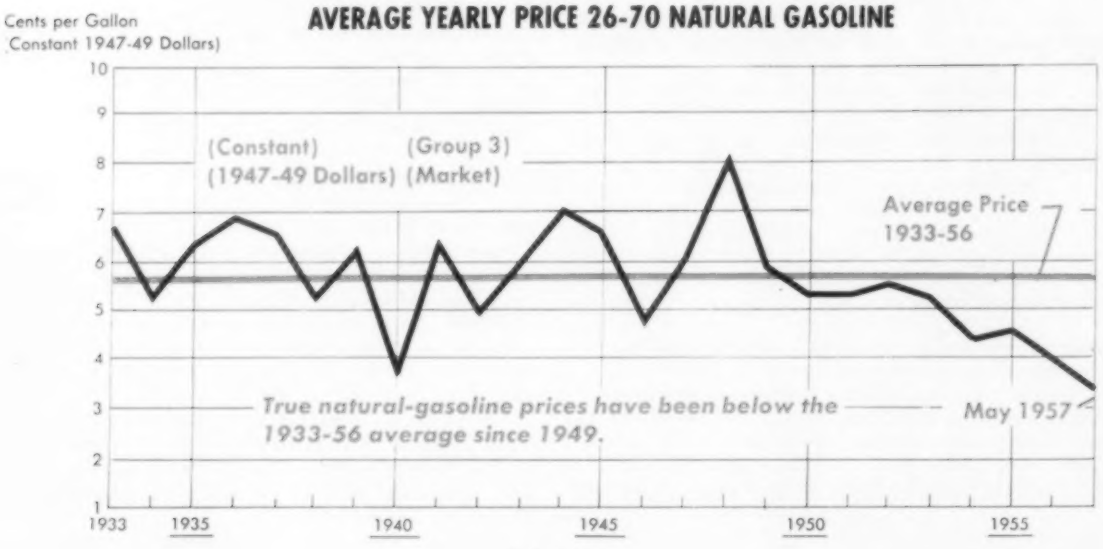


FIG. 13.

TABLE 6—NATURAL GAS PROCESSED AT PLANTS

(Gas volumes in billions of cubic feet)
(Liquid volumes in millions of gallons)

	Gross production of gas	Gas processed at plants	Per cent processed	Liquids produced at plants	Gal. of liquid per M.c.f.
1941	4,103.5	2,763.3	67.3	3,395.9	1.23
1942	4,453.9	2,864.4	64.3	3,499.5	1.22
1943	5,160.6	3,028.0	58.7	3,684.1	1.22
1944	5,614.2	3,300.0	58.8	4,201.9	1.27
1945	5,902.2	3,653.9	61.9	4,704.2	1.29
1946	6,190.2	3,663.8	59.2	4,861.0	1.33
1947	6,733.2	4,070.2	60.4	5,551.3	1.36
1948	7,178.8	4,393.5	61.2	6,162.3	1.40
1949	7,546.8	4,656.1	61.7	6,597.6	1.42
1950	8,479.7	5,341.8	63.0	7,642.4	1.43
1951	9,689.4	6,203.1	64.0	8,599.7	1.39
1952	10,272.6	6,418.6	62.5	9,387.6	1.46
1953	10,645.8	6,837.3	64.2	10,020.3	1.47
1954	10,984.9	7,459.9	67.9	10,589.6	1.42
1955	11,719.8	*7,975.0	*68.0	11,817.6	1.48
1956	*12,500.0	*8,500.0	*68.0	12,081.4	1.42
		Forecast			
1957	12,800.0	8,840.0	69.0	12,632.0	1.43
1958	13,530.0	9,410.0	69.5	13,644.0	1.45
1959	14,040.0	9,830.0	70.0	14,717.0	1.50
1960	14,650.0	10,400.0	71.0	15,987.0	1.54
1965	17,670.0	13,250.0	75.0	21,769.0	1.64

*Estimated.

prices by years. (Spot prices for this chart were corrected by using the wholesale price index with 1947-49 equal to 100).

Except for the very low price in 1940, the averages for the past 3 years have been lower than any other for the past 23 years. Also, there hasn't been a year since 1949 with a price for the year higher than the average for the entire 1933-56 period.

The problem for the plant operator is to determine what effect the addition of an isomerization unit will have on his realization from the plant. If plant capacity is large enough, the units probably will solve the problem.

If motor-fuel octane numbers continue to climb, operators of smaller plants may have to work together to set up the necessary processing units for upgrading the low-quality products.

The problem is pressing. The sharp decline in natural-gasoline prices and the widening gap betweeen motor-fuel and natural prices increase the probability of a short-term payout on the required processing units. The problem should be completely solved by 1960. Before 1965 rolls around, there will be no need for price quotations on Grade 26-70 natural gasoline.

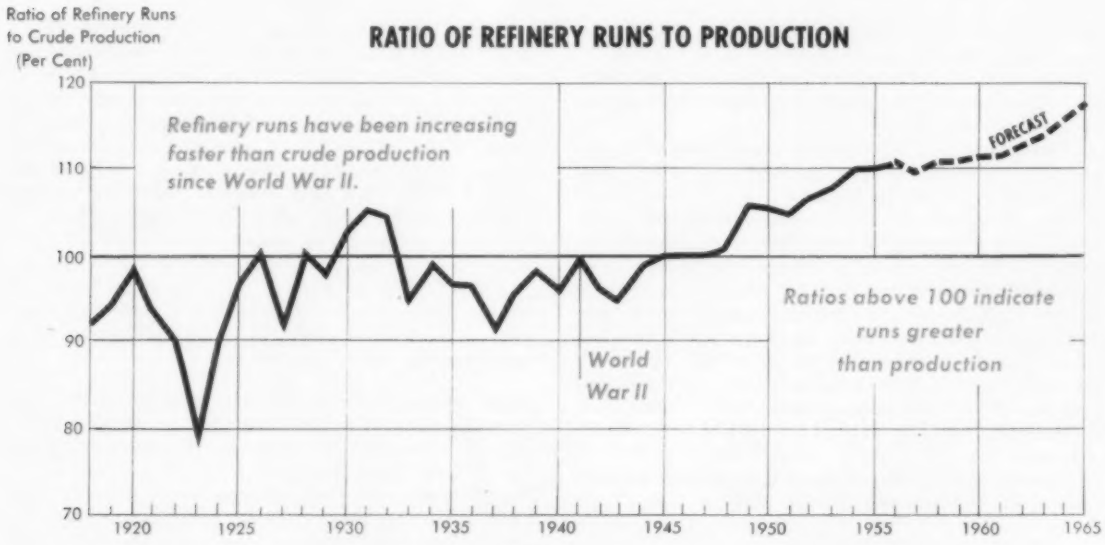


FIG. 14.

Refinery runs outrunning production

One trend has dominated the general refinery capacity picture since World War II: Refinery runs have been climbing faster than crude production.

The cause: This country has shifted from a net exporter of crude to a net importer. Since most of the imported crude is processed at refineries, it was the domestic-crude producer who lost part of his market.

Refinery throughput has felt the effect of imports only to the extent that receipts of foreign refined products replaced materials produced at domestic refineries. Most of this had been residual fuels.

The order of events indicates that the increase in product imports was more effect than cause. Shifts in processing at refineries in this country boosted yields of light products with corresponding reductions in the output of heavy fuels. The loss of residual production was covered by imports of the product, mostly from refineries in the Caribbean.

Since heavy fuel sells for prices well below the cost of crude, there is little chance that refineries in this country will return to any process program that would include increased yields of residual.

Fig. 14 shows the relationship between refinery runs and crude production. When the line has an upward slope, as in the period since World War II, refinery throughput is increasing at a faster rate than crude production. Note that the forecast to 1965 calls for a continuation of the upward trend.

Table 7 shows trends in factors influencing refinery runs. The controlling item is total demand for all crude and products.

The outlook . . . Except for unusual situations, such as

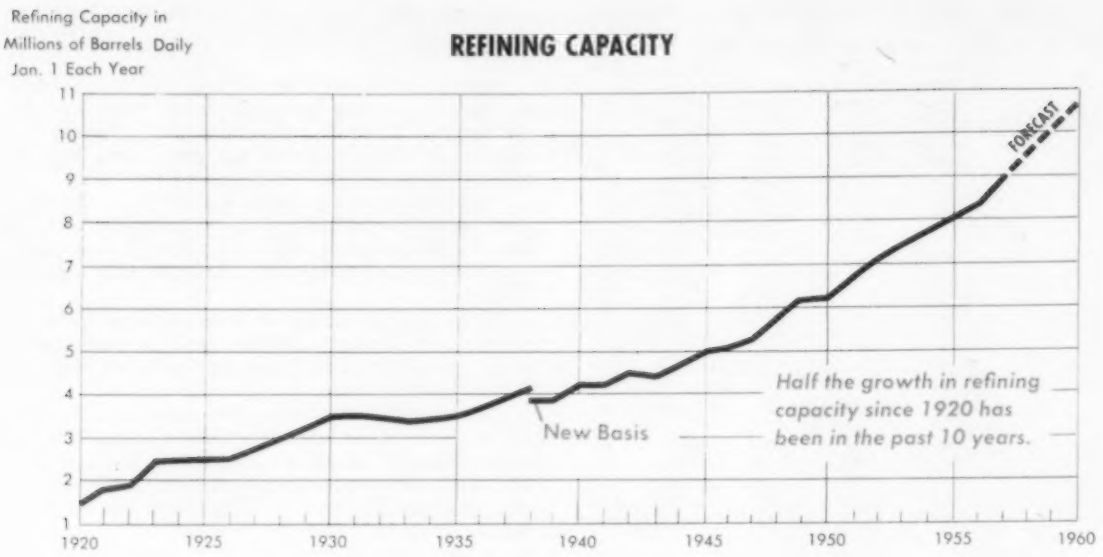


FIG. 15.

the closing of Suez Canal, exports of crude will remain at a very low level in the future.

Product output at field-processing plants will continue to increase. The average for 1965 is expected to top 1,400,000 bbl. daily.

Refinery runs probably will reach 9,000,000 bbl. daily by 1960, 10,000,000 bbl. daily by 1963, and 11,000,000 bbl. daily by 1965.

Fig. 15 shows changes in refining capacity since 1920, and a projection to 1960. Crude capacity is forecast at 10,500,000 bbl. daily for the start of 1960 and 12,900,000 bbl. daily for the first of 1965.

The Gulf Coast area has accounted for 36 per cent of total gain in refining capacity since 1940. The Texas portion of the area had 1,082,300 bbl. daily more capacity on January 1, 1957, than at the beginning of 1940. For the same period, the Louisiana Gulf Coast was up 625,500 bbl. daily.

TABLE 7—TRENDS INFLUENCING REFINERY RUNS
(Thousands of barrels daily)

	Total demand	Crude exports transfers and losses	Gas liquids production	Product imports	Product stock change	Refinery runs
1940	3,981	214	161	112	42	3,536
1941	4,369	171	231	128	22	3,861
1942	4,293	211	235	65	—127	3,655
1943	4,579	229	247	136	—50	3,917
1944	5,133	216	280	130	44	4,551
1945	5,358	197	315	108	—27	4,711
1946	5,331	227	323	141	100	4,740
1947	5,902	279	264	169	—15	5,075
1948	6,143	205	402	161	222	5,597
1949	6,130	149	431	224	1	5,327
1950	6,812	156	499	363	—43	5,739
1951	7,475	134	562	354	69	6,494
1952	7,712	115	612	379	64	6,670
1953	8,005	99	655	386	135	7,000
1954	8,115	84	692	396	15	6,958
1955	8,827	89	772	456	—20	7,480
1956	9,186	147	787	493	178	7,937
			Forecast			
1957	9,624	224	824	536	7	8,047
1958	9,970	90	890	570	30	8,450
1959	10,430	75	960	625	30	8,800
1960	10,900	75	1,040	660	25	9,150
1965	13,450	60	1,420	800	30	11,200

The LONG Look Ahead — 1965

Gains for all important refining areas are shown in Fig. 16. The figures at the end of each bar shows the percentage gain from 1940 to 1957.

Part of past increases in refining capacity on the Gulf Coast has been for actual consumption on the East Coast. Total refinery input of crude for the coastal area of Texas and Louisiana averaged 2,653,000 bbl. daily in 1956. Gas liquids blended averaged another 132,500 bbl. daily for a total of 2,785,500 bbl. daily.

Tanker shipments of products from the Gulf Coast to the East Coast averaged 1,481,000 bbl. daily, accounting for 53 per cent of the total refinery activity on the Gulf Coast. Another 96,000 bbl. daily was shipped from Louisiana and Texas to District 2 by barges on the Mississippi River.

Major shifts . . . In past years, refining on the Gulf Coast increased at a faster rate than on the East Coast.

For example, refinery runs on the Gulf Coast topped East Coast runs about 15 to 20 per cent in the late '20s and early '30s. During World War II, Gulf Coast runs were 90 to 100 per cent greater than runs on the East Coast. For the year 1956, the Gulf Coast was out in front by 136 per cent.

This trend may not continue. Most of the indicators of the change are based on the probability that a major portion of any increase in crude imports will be in Middle East oil.

Most of the Middle East crude coming into the eastern half of the United States will enter the country and be refined on the East Coast.

Since East Coast population expansion probably will shift toward the south, some of the new refining capacity for the district can be expected to be in the South Atlantic states. The new refineries of American Oil Co. in Virginia and Tidewater Oil Co. in Delaware represent a start in that direction.

Quality race . . . A large part of total capital requirements for the refining division of the industry will be for additional processing.

As long as there is demand for increased power and performance in the automobiles of this country, the refiner will have a problem of leading the parade with better fuels.

There has been no letup in the demand for higher-

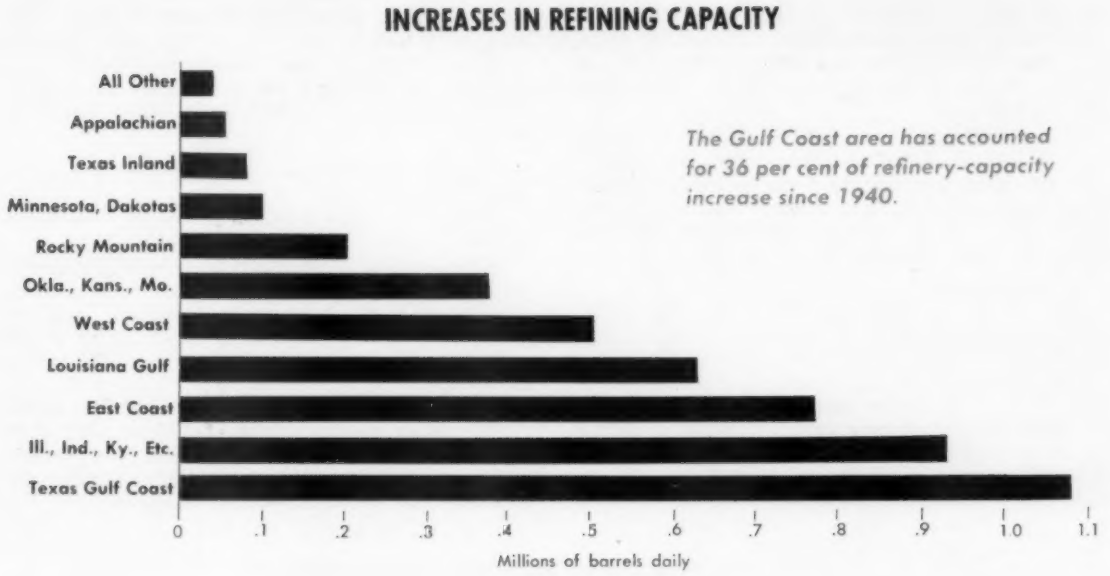


FIG. 16.

octane gasoline. Current industry forecasts show that the process planners are thinking in terms of 110 octane or better for premium gasoline by 1960 or soon after. (OGJ, May 20, pps. 112 and 137).

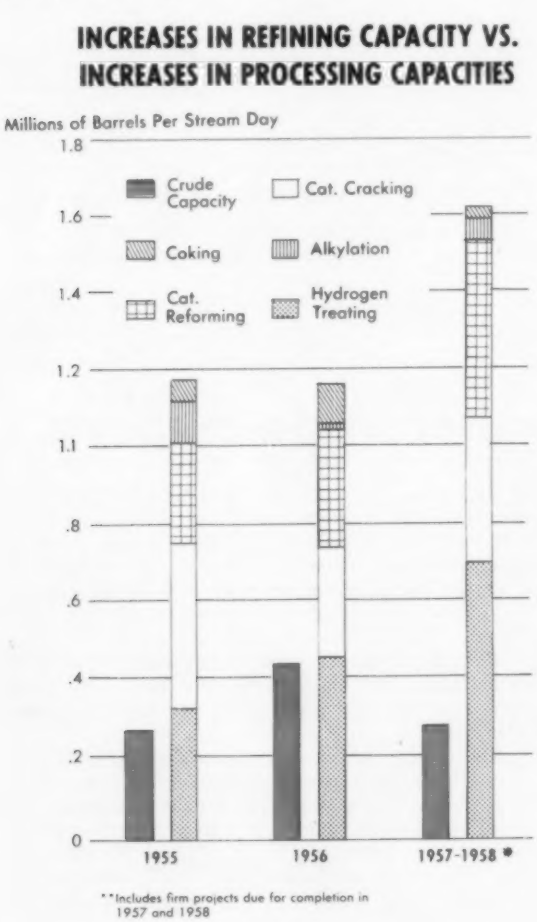


FIG. 17.

Refiners will reach this quality level through a series of expansions in processing. The most important advances in road-octane quality will come from these two steps:

. . . **Alkylation of all butylenes and amylenes.** Demand for aviation gasoline is not increasing at the rate that existed in the first 10 years after World War II. The result has been that refiners have had some alkylate available for automotive blends. They will need more.

. . . **Superfractionation** of light naphthas and isomerization of normal pentane and hexane. This is the same solution that natural-gasoline suppliers are working toward in the program of raising the blending quality of the heavier gas-liquid fractions. Isomerization will take on more importance when refiners' programs call for still higher-octane gasoline above cat reforming.

Actual volumetric increases in processing capacities will be determined by (1) programs for increasing octane numbers, (2) progress on research projects hunting for new ways to improve gasoline, and (3) possible shifts in automotive fuels.

Fig. 17 shows actual increases in crude capacity for the years 1955 and 1956 compared with increases in capacities of process units. Note that increases in crude-input capacity are much less than combined additions of process units.

Firm projects for the next 2 years are pictured in the last two columns. Many other units probably are planned but have not been announced. Announced increases in crude capacity will not cover expected gains in refinery runs.

Process units will take a big portion of the capital spent by the refining division of the industry.

Petrochemicals

Production of petrochemicals is the youngest member of the petroleum family. He is growing so fast that the parent industry has trouble keeping him fed and in clothes.

Petrochemical production seems to have passed the low-volume-growth segment of the normal-growth curve. At first the volumetric increases were small each year. Percentage increases were large because the calculations were made from low base totals.

These same high percentage increases have contin-

ued but now are calculated on large base totals. This results in big volumetric increases.

It has been estimated that total petrochemical production may reach 60 billion pounds by 1960. (OGJ, Sept. 3, 1956, p. 65).

Since total output for 1955 was about 31 billion pounds, the forecast of 60 billion means that production will almost double in the 5-year period. The annual rate of gain would be a little better than 14 per cent a year. This rate of increase probably can't be maintained for many years beyond 1965.

Here's the picture:

To get an idea of the growth at this rate, 60 billion pounds is equivalent to the weight of 200 million barrels of 36°-gravity crude. The gain of 30 billion pounds in the 5 years from 1955 to 1960 would be equivalent to 100 million barrels of oil.

Since the rate of gain doubles production each 5 years, the gain from 1960 to 1965 would be equal to 200,000,000 bbl. of crude and 400,000,000 bbl. for the 1965-70 period. In about two more periods after that, the gain for petrochemicals would be greater than the gain for total oil and gas.

These trends indicate that petrochemicals' gain rate may start slowing down by 1960, but it is possible that the total may be as high as 75 billion pounds by 1965.

The leaders . . . Ethylene and its derivatives lead the petrochemical parade.

Production topped 3 billion pounds in 1956 and is expected to go to about 4 billion by 1960.

Recent capital expenditures have been greatest for polyethylene facilities. The strength of the market for polyethylene is shown by the sales increase of almost 45 per cent in 1956. Sales for 1955 amounted to 346 million pounds and increased to about 500 million for 1956.

Not more than 2 years ago, the general forecast for petrochemicals was for a gain of 200 per cent in 20 years. Recent forecasts are for almost 100 per cent in 5 years—1955 to 1960. Actual gains probably will be somewhere between these two estimates.

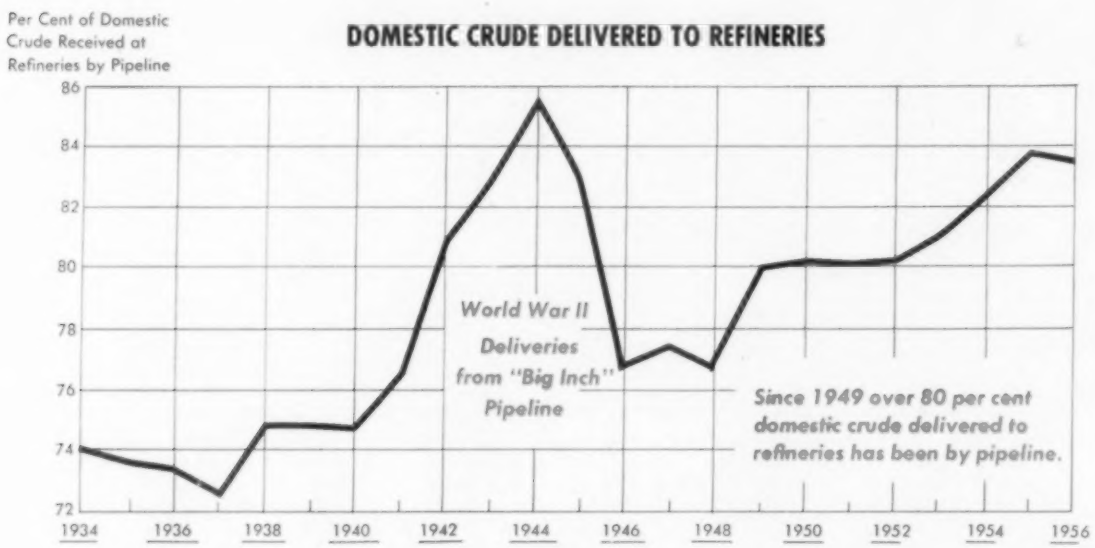


FIG. 18.

Pipeline growth will parallel crude-oil gains

Use of pipelines for delivering oil and gas has had its greatest growth since the end of the war.

Look at just two developments since 1947:

Pipeline movement of products has had its greatest expansion.

Interstate shipments of natural gas moved up rapidly after that year with coming of the large-diameter pipelines.

Increasingly larger percentages of the domestic crude used at refineries were delivered by pipelines.

All of these trends have been factors in the phenomenal growth in pipelining since the end of the war.

Crude lines . . . Future growth in volumes of crude moved by pipelines is expected to be at about the same percentage rates as the gain in use of domestic crude.

It is forecast that pipelines will carry from 80 to 85 per cent of the domestic crude that is delivered to refineries. This means that this part of the total crude will arrive at the refinery gate by pipeline. Most of the crude that is actually delivered to the refinery by tanker or barge will have made part of the journey by pipeline. Fig. 18 shows changes in receipts at refineries.

A large volume of crude is delivered to refineries on the East Coast by tankers, lifted from Gulf Coast ports. However, this crude moved to tidewater points by pipeline.

The forecast of crude production in Table 2 shows an average increase in production of crude in this country of almost 260,000 bbl. daily for the period 1956-65. Since lines will be built with a little reserve capacity, crude lines or loopings will be added at the rate of at least 275,000 bbl. daily per year. Some shifts in average length may come with the opening of new producing areas.

In recent years, there has been some discussion of

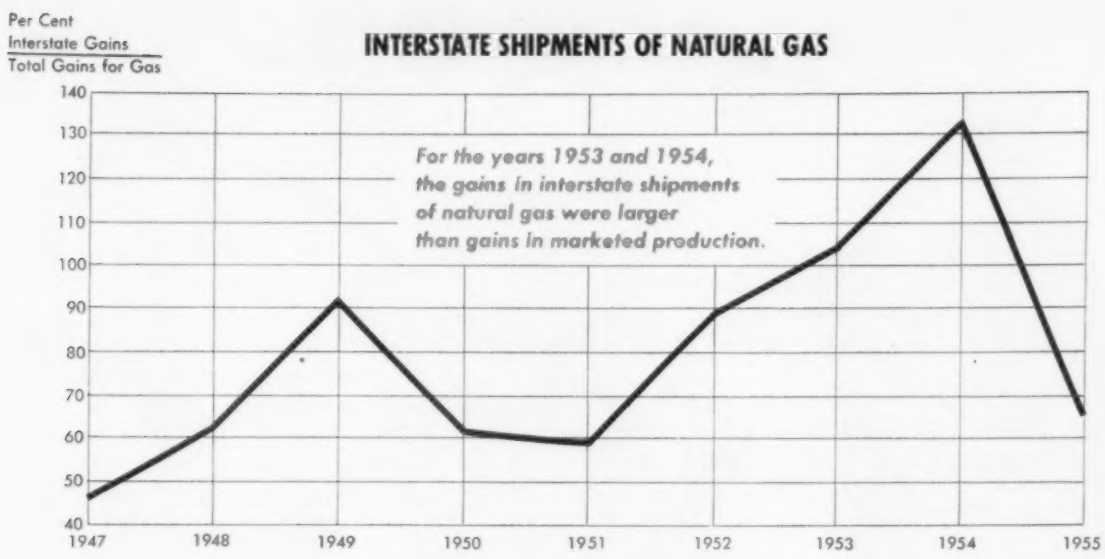


FIG. 19.

a crude line connecting the East Coast with inland refining areas.

If such a line is laid, it will carry crude from the East to the West. The material carried would be imported crude. If this line is built, the time is likely to be near the end or after the forecast period.

Gas lines . . . The growth in natural-gas pipelining is expected to be irregular.

Fig. 19 shows this same pattern of irregular growth since the end of World War II. The line on the chart shows what per cent of total gains in marketed production were due to increases in interstate shipments. This ratio was used since interstate shipments represent longer lines. and the difference between interstate and intrastate shipments may mean the difference between control and no control by the federal Government.

Note that in 1953 and 1954, the gain in interstate shipments were larger than total gains in marketed production. These followed the opening of large-diameter, long-mileage gas lines. Some of the gas for the lines previously had been sold for boiler fuel within producing states.

The volume of gas moved by pipelines must be the same as total volume produced, but the amount of pipe required will be determined by the average distance the gas is moved.

Trend in growth . . . Actual pipeline capacity will increase at the gross rate of about four large-diameter lines per year. Here are the basic figures back of the forecast.

Marketed production of natural gas amounted to 10.12 trillion cubic feet of gas in 1956, excluding field and production losses. By 1965, production on the same basis is expected to total 15.92 trillion cubic feet. The gain is 5.8 trillion for the period or an average of 644 billion cubic feet per year.

A large-diameter pipeline will move about 400

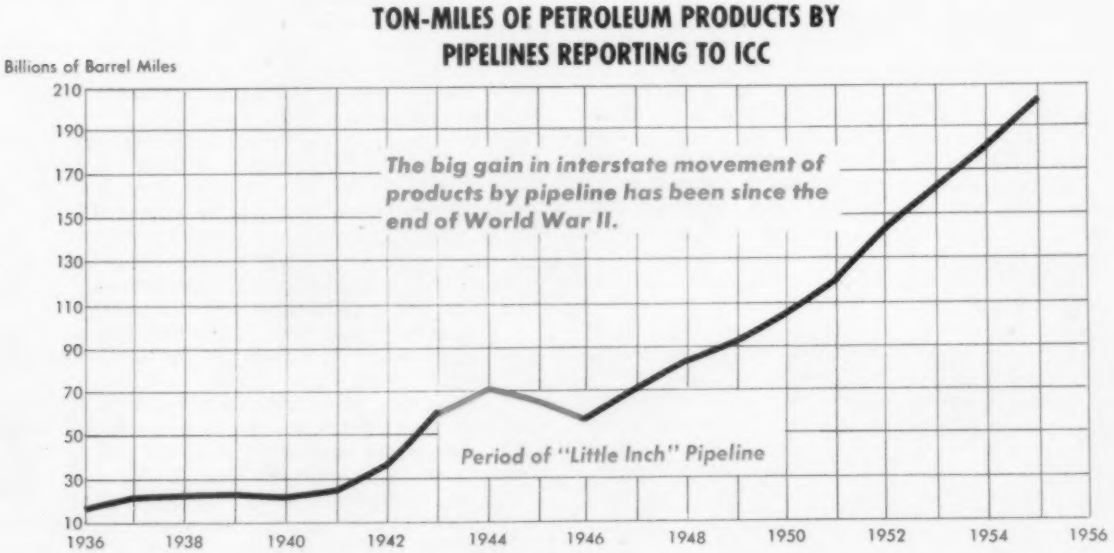


FIG. 20.

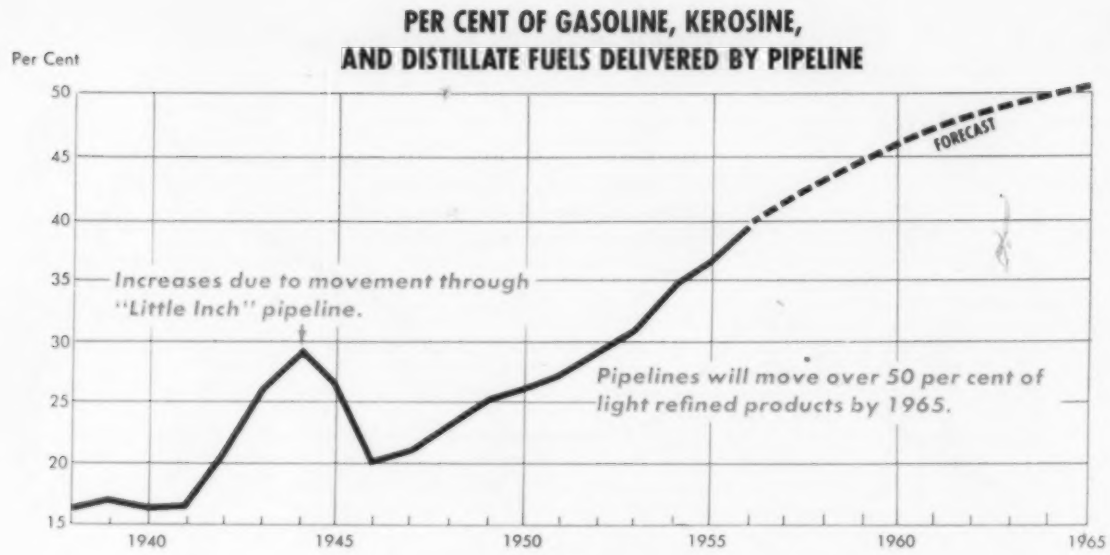


FIG. 21.

million cubic feet per day. Some are above and some below this average. The rate would mean an annual total of 146 billion cubic feet per year.

The annual gain in production of 644 billion divided by the 146 billion credited to each line would give 4.4 pipelines per year.

Gas producers will need 4.4 new big lines per year between now and 1965. How long those lines will be may be influenced by actions of Congress. If interstate shipments mean federal control of the independent producers, some of the lines will be short.

Product lines . . . Most of the growth of product pipelining has been since the end of World War II and almost all of it in the past 20 years.

Fig. 20 shows product pipeline activity of companies reporting to the Interstate Commerce Commission. The total is reported in barrel miles of products moved each year. Note, that total barrel-miles of products moved in 1955 was almost 3.5 times the 1946 total and 10 times that for 1936.

Fig. 21 shows per cent of gasoline, kerosine, and distillate demand moved by pipeline each year and a projection of the ratio to 1965. Data are from the Bureau of Mines.

The big hump in the line for the years 1942-45 was due to the unusual movement through the "Little Inch" War Emergency Pipeline, delivering products to the East Coast from the Southwest.

The big boost in product pipeline shipments between 1946 and 1956 replaced some high-cost deliveries. The expansion will continue, but the rate of increase will not be at the pace set in the postwar years.

Pipeline movement of products (gasoline, kerosine, and distillates) probably will rise to 51 per cent of domestic demand for these products by 1965. In the meantime, demand for these products will rise.

Domestic demand for gasoline, kerosine, and distillates will move up to about 8,750,000 bbl. daily by 1965. At 51 per cent of the total, pipelines will average 4,460,000 bbl. daily of these products. The average for 1956 was 2,270,000 bbl. daily, showing a total gain for the 9-year period of 2,190,000 bbl. daily. The average increase per year will be about 243,000 bbl. daily.

Summary . . . The figures show this probable need: 275,000 bbl. daily of new crude-line capacity a year, four large gas lines a year—short or long depending on legislation, and about 240,000 bbl. daily of gasoline-kerosine-distillate products lines per year.

The products-line total does not include movement of L.P.G. and natural gasoline either in past data or in the projection. There is very little background information from which to forecast shipments of these products in the future, but the few signs available point to rapid expansion of light-products pipelining over the next 9 years.

Windup

Oil is an industry of problems. Oil is a growth industry. Both statements are related, for the solution of every problem has been a stepping stone to higher levels of production and service.

The progress of civilization parallels the growth in use of energy fuels. Since the start of the twentieth century, the population of this country has increased at the rate of about 1.44 per cent a year. The rate of gain in total consumption of energy fuels has been about 2.8 per cent a year or almost double the gain rate for population.

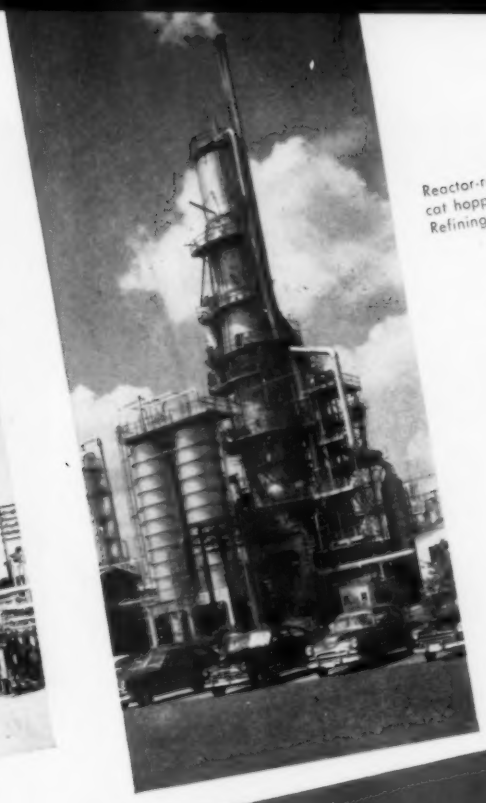
This gain in per capita energy consumption is the prime reason for the improved standard of living in this country. Petroleum's contribution to this job of lifting every citizen to a higher economic level is shown by its part in the over-all energy pool. Compared with annual gains of 2.8 per cent in total energy consumption, consumption of oil and gas has increased at the rate of almost 7.2 per cent a year.

The industry grew because it is dedicated not only to finding ways to do a better job but to finding new jobs to do.

The industry goes further than discarding old processes or equipment when the new is proved to be better. It spends large sums each year to make its processes and equipment obsolete.

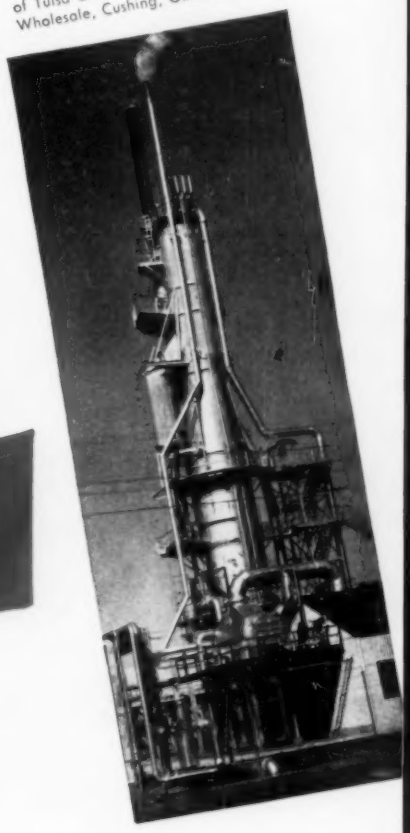
A big contribution to this research and development work is made by the large group of companies that furnish material, machines, and ideas for petroleum's big growth program.

Reactor-regenerator for UOP Catalytic Cracking Unit furnished through Refining Engineering Co. of Tulsa for Kanotex Refining Company, Arkansas City, Kansas.



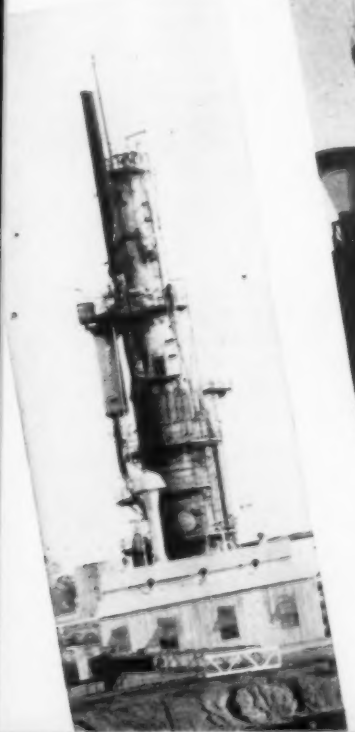
Reactor-regenerator and two cat hoppers built for Rock Island Refining Company at Zionsville, Ind.

UOP reactor-regenerator built for the Refining Engineering Company of Tulsa at Midland Cooperative Wholesale, Cushing, Oklahoma.



REFINERY BEAUTY

UOP reactor-regenerator unit furnished for the Ben Franklin Refining Co., Ardmore, Oklahoma



Regenerator, part of a Model IV Catalytic Cracking Unit, furnished through Fluor Corporation Ltd. for Standard Oil Company of California, El Segundo, California.

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From Quebec's lowland to the prairie provinces and beyond . . .

Canada is optimistic—and justly so

IN CONTRAST to the depths of pessimism into which the U. S. oil industry seems to have plunged, Canada is steeped in rosy optimism. Here is a land just on the verge of an enormous oil and gas exploration era, and the reasons for optimsm are myriad. No other part of the North American Continent holds such temptations for the wildcatter as western Canada.

Here is an immense expanse of 740,000 sq. miles of potential oil country, of which only 230,000 sq. miles has been explored at all. This means that less than one-third of the target has been touched. Small wonder then that Canadian oil hunters are almost wildly optimistic. In the short period of 10 years they have discovered 3½ billion barrels of oil and more than 20 trillion cubic feet of gas.

To discover this oil, one major company has estimated that the industry has spent 3.5 billion dollars or approximately $1 per barrel discovered; this breaks down into 1.4 billion for exploration, 1.1 billion for development and production, and 1 billion for transportation, refining, and marketing. From an economic standpoint, then, Canadian operators are in much the same position as offshore operators in the Gulf of Mexico—they have spent more than they have reaped in dollars. But they know that the era of profit lies yet ahead, and they are supremely confident that they will find much more oil than they have so far uncovered; their goal for the next 10 years is to discover an additional 7½ billion barrels of oil. To find this huge reserve, more than twice the present reserve, will require the drilling of nearly 40,000 wells in the next decade.

The amazing success record of 1956 in western Canada is enough to make an American wildcatter's eyes bulge. During that year the success ratio on wildcat drilling was 31.5 per cent, or nearly one out of three, and the success in development drilling was a whopping 93 per cent. There is no pat explanation for this except that the search has been conducted on the highest plane of scientific guidance via geophysics, subsurface geology, etc. The success is a glaring contrast to the pre-1947 era which was best pointed up by Imperial Oil, Ltd.'s, record of 133 dry holes prior to the Leduc discovery.

The 1957 Record

The wildcat success record has not carried over into the first half of 1957. An examination of the tables shown above reveals that of 390 wildcats drilled 70 were hits, for a success percentage of only 18. In development drilling, however, the trend continued with 941 hits out of 1,037 tries, for a success percentage of 90.7.

Outstanding among the first half discoveries in 1947 were the reservoirs of the Devonian formation. Perhaps the most important of these were: Home Oil Co. et al's strikes at Virginia Hills and Swan Hills, Phillips Petroleum Co.'s Kaybob discovery, and the more recent Canadian Oil Companies et al discovery at Innisfail.

Swan Hills, Virginia Hills, and Kaybob opened a new

WESTERN CANADA—FIRST 6 MONTHS 1957

	Total Completions				
	Total	Oil	Gas	Dry	Footage
Alberta	690	439	57	194	3,661,508
Saskatchewan	563	403	3	157	2,440,395
Manitoba	127	83	0	44	284,002
British Columbia	44	4	22	18	235,808
Northwest Territories	3	0	0	3	9,565
Western Canada	1,427	929	82	416	6,631,278

	Total Wildcats				
	Total	Oil	Gas	Dry	Footage
Alberta	189	16	22	151	1,028,490
Saskatchewan	138	18	2	118	561,788
Manitoba	34	0	0	34	91,889
British Columbia	26	4	8	14	151,849
Northwest Territories	3	0	0	3	9,565
Western Canada	390	38	32	320	1,843,581

	Total Field Wells				
	Total	Oil	Gas	Dry	Footage
Alberta	501	423	35	43	2,633,018
Saskatchewan	425	385	1	39	1,878,607
Manitoba	93	83	0	10	192,113
British Columbia	18	0	14	4	83,959
Western Canada	1,037	891	50	96	4,787,697

reservoir for western Canada—the Devonian-Slave Point formation. In addition to tapping a new reservoir rock they threw open to exploration a vast expanse of previously unexplored territory in the western Alberta Plains. The Innisfail discovery revealed a Devonian D-3 reef that has been called the most important such discovery since 1952 when Sturgeon Lake was discovered. Canadian Oil Companies has revealed the presence of a 150-ft. reef reservoir at the well. This is off the established reef fairway in Alberta, and could be the forerunner of a new southern trend pointing at Calgary and the United States border.

Elsewhere in the prairie provinces, southeast Saskatchewan kept up its fantastic drilling and development spree which began in 1955 and reached fever pitch in 1956, while British Columbia planted its foot firmly into the oil producing picture with no less than six new fields discovered since January 1.

A Changing Situation

Eastern Canada, too, is the scene of renewed wildcatting activity. Important gas reserves are being uncovered in Ontario, under the waters of Lake Erie, and in the St. Lawrence Lowlands of Quebec. A dozen companies have taken concessions in the Lowlands between Montreal and Quebec, and the few gas discoveries so far scored point to more in the future. The ready market and excellent price emphasize a search for gas, not oil, in eastern Canada.

Gas, as a matter of fact, has come to the fore throughout the dominion. At one time, only a couple of years back, it was a drug on the market, and thousands of gas wells stood capped awaiting a market. But the arrival of a market via the great natural gas pipelines now being built both to the east and west coasts has reversed the situation, and the search for a market has become a search for reserves.

Shell Oil Co. of Canada recently released some interesting figures on the finding record in western Canada. The company estimates that for every wildcat drilled in Canada (whether dry or wet) the industry has discovered 700,000 bbl. of oil—this versus a similar figure in the United States of 300,000 bbl. For every **successful** wildcat Canadian oil men found 4.4 million barrels compared to a U. S. figure of 1.5 million barrels. On a footage basis, Shell points to a finding rate of 33 bbl. per foot drilled in Canada (all drilling) versus a 13-bbl. figure in the United States. Canadians have good reason, therefore, to be enthusiastic about what has happened so far.

These accomplishments when viewed in true perspective have taken place in only a small part of the over-all hunting ground which lies before Canadians. They have been confined to those areas blessed with accessibility and market outlets. But when one thinks of the immense unexplored territory in the northern reaches of western Canada, the prospects become a little overwhelming. The over-all wildcat drilling density of oine wildcat to every 160 sq. miles, when broken down by areas, looks something like this: one wildcat per 700 sq. miles in northern Alberta; in the western foothills of Alberta, one wildcat for every 500 sq. miles; and in the Northwest Territories, far to the north, one wildcat for every 7,000 sq. miles. Canadians, then, feel that their exploration job, to bring them up to par with the United States, has progressed only one-tenth of the way. They have come one-tenth of the way in 10 years so if we carry the comparison into the future, we might say that nearly a century of concentrated exploration lies ahead of Canada.

People Are Most Important

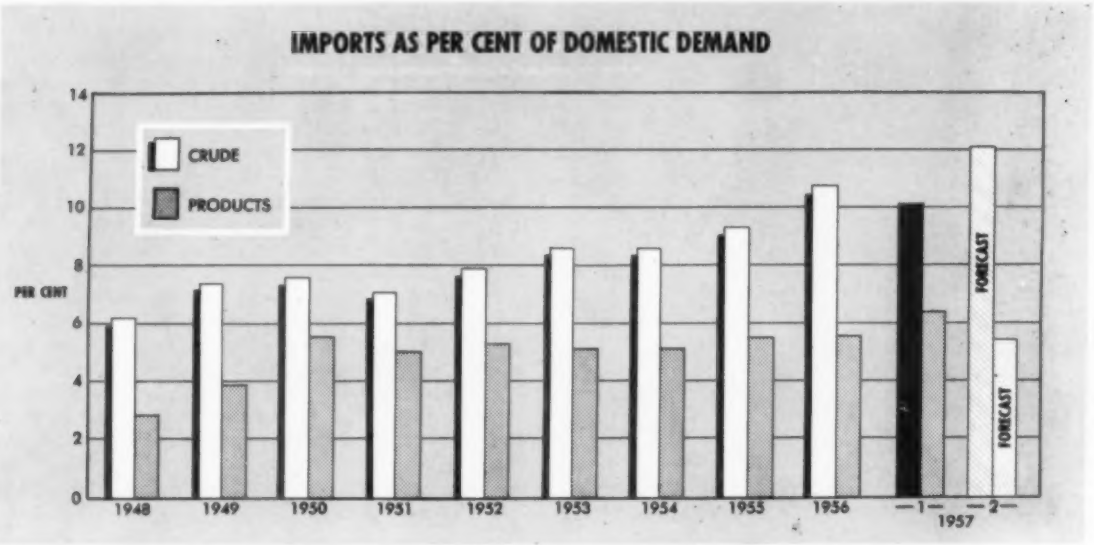
To carry out this exploration for oil and gas, dominion operators will need ever-increasing amounts of supplies, services, and . . . men. A shortage of labor besets both industry and agriculture, and the government continues to encourage immigration as the best immediate solution. Another lack directly affecting exploration is an insufficient number of geology graduates from the colleges and universities.

The upsurge of interest and activity in mining throughout Canada has drained off much of the brainpower supply to those fields, and graduate oil finders are at a premium for the oil industry. Government agencies are busy here too, and constructive steps have been taken; these agencies, in conjunction with western oil companies, are sponsoring tours of the oil country by eastern university professors, meetings between students and oil-company people, and conferences aimed at steering student interest toward petroleum activities.

As the industry grows, the public becomes ever more conscious of its impact and importance to their daily lives. Here, too, the oil industry has taken advantage of its opportunity to promote public acceptance and good will. The Canadian Petroleum Association, based in Calgary, has literally "taken the industry to the people" through a program of town-hall meetings between citizens and industry.

The resounding success of the program is reflected in the widespread public approval of oil-company programs and in an almost universal interest in share ownership of Canadian oil securities. The recent declaration of a $22 per head dividend to citizens of Alberta by its provincial government served to accent the public's stake in the industry.

Canadians are beginning to take the oil industry more in stride. They learned from American experience a lot of exploration know-how, development and transportation techniques, conservation procedures, and now they are on the threshhold of the most important phase of operations for the future—that of secondary recovery. This mutual exchange of oil-industry techniques has worked and will work to the benefit of both countries and as it progresses the international boundary spins into an ever finer thread and as pipelines continue to pierce the filmy air curtain at the forty-ninth parallel, we will witness the development of a true continental concept in oil.



Crude imports to top 1¼ million daily

EXPORTS gained almost five times as much as imports in the first half of the year. But, the figures themselves do not tell the full story.

Crude imports were down in the first quarter because of the tanker shortage following the closing of Suez Canal and Iraq-East Mediterranean pipeline.

Total crude imports for the quarter averaged 808,000 bbl. daily compared with 862,000 bbl. daily in the first quarter of 1956. After a partial settlement of the Suez problem, crude imports moved up to 1,012,000 bbl. daily in the second quarter. This rate represents a gain of 10.8 per cent over the second quarter of 1956.

Importing companies, reporting to the Texas Railroad Commission, showed plans for at least 1,200,000 bbl. of crude daily in the third quarter. This would be 15.1 per cent above the average for the third quarter last year.

The Office of Defense Mobilization estimated that crude imports will average 1,260,000 bbl. daily for the last half of the year unless company plans are revised. These plans probably will be changed by some type of government action. However, the time required to make changes in tanker schedules will prevent any big cut in foreign crude receipts for the third quarter.

The table on imports of crude by country or origin shows how the Suez problem changed the pattern of crude receipts for the first 4 months of the year. Crude from Latin America was up 24.5 per cent while Middle East imports dropped 77.4 per cent. About 44 per cent of Middle East crude received during the 4 months was recorded in April. Crude from Canada represented the largest relative gain, up 62.8 per cent.

CRUDE IMPORTS BY COUNTRY OF ORIGIN*
(Thousands of barrels daily)

	Jan.-Apr. 1957	Jan.-Apr. 1956	Change	Per cent change
Mexico	9.2	12.7	—3.5	—27.6
Colombia	23.2	22.2	1.0	4.5
Venezuela	531.0	412.9	118.1	28.6
Peru		2.0	—2.0	
Trinidad		1.9	—1.9	
Ecuador		1.0	—1.0	
Latin America	**563.4**	**452.7**	**110.7**	**24.5**
Kuwait	45.1	118.1	—73.0	—61.8
Saudi Arabia	3.8	82.6	—78.8	—95.4
Neutral Zone	5.1	10.9	—5.8	—53.2
Iraq		28.8	—28.8	
Iran	5.8	16.7	—10.9	—65.3
Qatar		7.7	—7.7	
Middle East	**59.8**	**264.8**	**—205.0**	**—77.4**
Canada	176.1	108.2	67.9	62.8
Far East	33.0	24.9	8.1	32.5
Total crude	**832.3**	**850.6**	**—18.3**	**—2.2**

*U. S. Bureau of Mines.

IMPORTS INTO CONTINENTAL UNITED STATES
(Thousands of barrels daily)

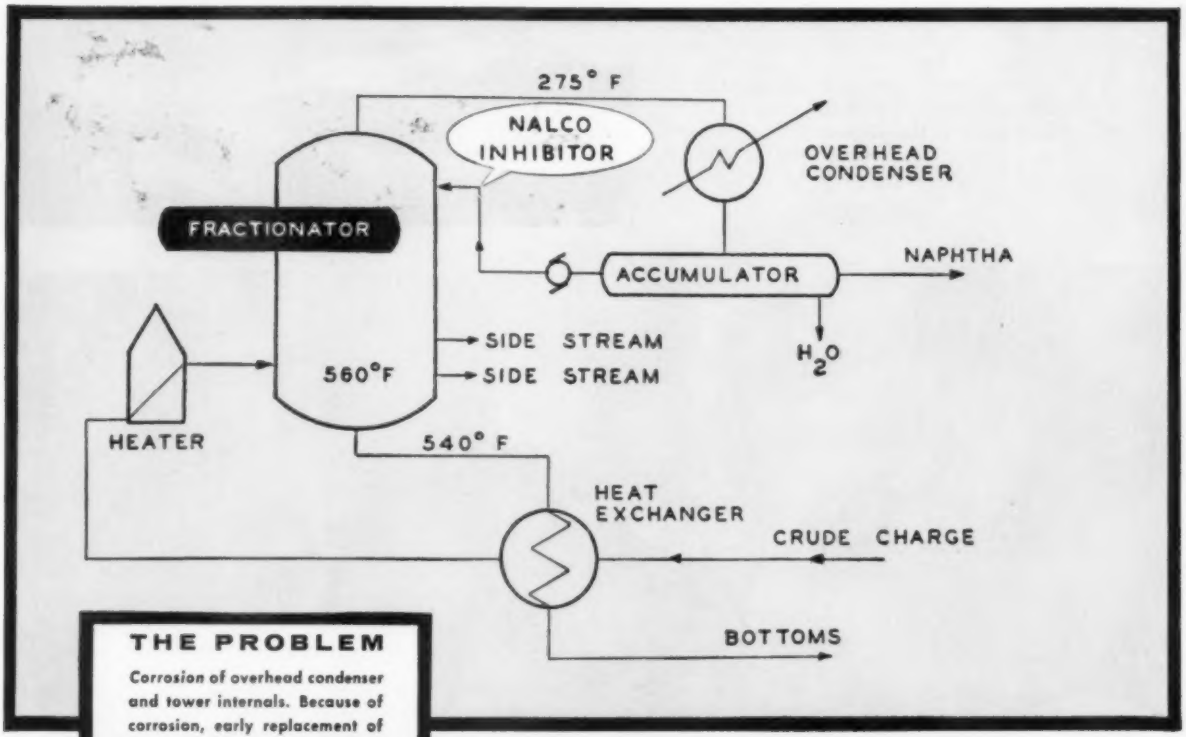
	Jan.-June 1957*	Jan.-June 1956	Change	Per cent change
Crude	910.0	888.0	22.0	2.5
Residual fuel	517.0	473.5	43.5	9.2
Other oils	61.0	41.1	19.9	48.4
Total	**1,488.0**	**1,402.6**	**85.4**	**6.1**

EXPORTS
(Thousands of barrels daily)

	Jan.-June 1957*	Jan.-June 1956	Change	Per cent change
Crude	252.0	29.5	222.5	754.2
Gasoline	113.0	82.9	30.1	36.3
Kerosine	23.0	6.7	16.3	243.3
Distillate fuel	167.0	62.8	104.2	165.9
Residual fuel	115.0	66.9	48.1	71.9
Lube oils	40.0	38.7	1.3	3.4
Other oils	36.0	34.3	1.7	5.0
Total	**746.0**	**321.8**	**424.2**	**131.8**

*Four months actual, two months estimated.

HOW *Nalco* INHIBITORS CUT DOWNTIME 74% ... AND SAVED THIS FRACTIONATING TOWER



THE PROBLEM

Corrosion of overhead condenser and tower internals. Because of corrosion, early replacement of the tower was contemplated.

THE TREATMENT

Nalco Corrosion and Fouling Inhibitor applied into overhead reflux.

THE RESULT

In this case only one point of application protected both fractionator and overhead equipment. Iron in accumulator water brought below 0.5 ppm as compared to previous 100-150 ppm. Corrosion and plugging stopped, tower saved, and downtime for cleaning reduced by 74%.

EFFECTIVE Nalco corrosion control is very low-cost protection. For example, this refinery not only avoided the cost of a new tower, but cleaner tower internals actually resulted in better fractionation and higher quality products. If you would like further facts on Nalco Corrosion and Fouling Inhibitors, ask your Nalco Representative or write direct.

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The Flox Company, Inc., Minneapolis 3, Minnesota
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THE *Nalco*® SYSTEM ... SERVING INDUSTRY THROUGH PRACTICAL APPLIED SCIENCE

HOW WE WORK STEEL TO MAKE STEEL WORK FOR YOU

In the frozen north... Canada's first "BIG INCH"

WESTCOAST TRANSMISSION COMPANY is laying a 30 inch pipeline to tap the prolific gas resources of British Columbia and Alberta. This line runs from these fields due south to the international border. The 688-mile main line marks the first large-scale interchange of natural gas between western Canada's new and expanding fields and U. S. markets. A .O. Smith's Milwaukee mill supplied approximately 22% of the 30-in. pipe used on the project.

Northwest passage... new mileage for world's longest "crude line"

INTERPROVINCIAL PIPE LINE COMPANY has 1774 miles of main line now in service. They are extending this system another 156 miles during 1957. This big crude oil carrier extends from Edmonton, Alberta, to refineries in the Prairie Provinces and Ontario, in Minnesota, Wisconsin, and Michigan. Over 70% of the original line to Superior, Wisconsin, was supplied by A. O. Smith as well as most of the pipe for current and subsequent looping projects.

Want more facts about A. O. Smith products for the petroleum industry? Write today for free, illustrated brochure, "OIL"

Pressure vessels, heat exchangers

Glascote processing equipment

Gasoline dispensers, liquid meters

Today, as always . . .

there's A. O. Smith line pipe in major pipelines like these

Just about 30 years ago, A. O. Smith researchers developed the first truly practical method of mass-producing line pipe. *Result:* Pipelines, as we know them today, became economically feasible.

And A. O. Smith has kept the pace — with painstaking attention to quality in every production phase. This is the reason why A. O. Smith pipe, made and installed as far back as 1928, is still in operation today. This is the reason why you'll find A. O. Smith pipe in so many major high-pressure lines (including the four current projects pictured and described on these pages).

In the arid southwest... a river is pushed aside.

To cross New Mexico's San Juan river, **EL PASO NATURAL GAS COMPANY** temporarily diverted the river . . . used dry-land pipelining methods. The new line will supply an additional 350,000,000 cubic feet daily to customers in California and 100,000,000 cubic feet more daily to customers in Arizona, New Mexico, Texas and Nevada. A. O. Smith Corporation of Texas mill supplied approximately 224 miles of 34-in. pipe for the project.

Underwater project... "MUSKRAT LINE" submarines toward completion

TENNESSEE GAS TRANSMISSION COMPANY'S 355-mile pipeline extension is laid underwater four-fifths of its length — traversing swamps and marshland. It will give the Tennessee gas system more than 9500 miles of line in 15 states, with average daily capacity of 1,800,000,000 cu. ft. A. O. Smith supplied the 18 and 20-inch pipe and a portion of the 24-in. pipe for the new extension.

Welding machines, electrodes and accessories

Line pipe, oil well casing

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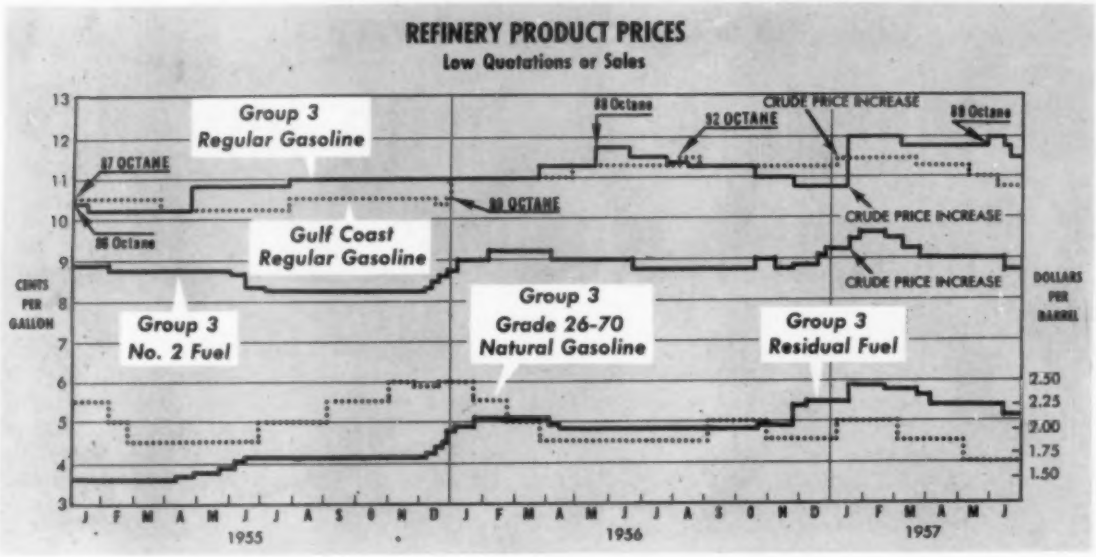


Some were holdovers, but first half saw . . .

New ills plague products markets

PETROLEUM PRODUCT markets suffered from a full series of pressures during the first half of the year. Some of the influencing factors were left over from last year. But, this year added a new set.

The following conditions make up part of the product-market climate for the first 6 months of 1957:

. . . **Gasoline stocks** were too high at the end of the motoring season last year. The total at the end of September was 27,780,000 bbl. more than a year earlier.

. . . **The Suez crisis** created a big export demand for crude and fuel oils. European marketers did not want to buy gasoline.

. . . **Increased runs** to meet European fuel demands last December resulted in further excess production of gasoline.

. . . **Warmer-than-normal weather** cut domestic demand for distillate fuels 7,900,000 bbl. below the previous winter. Kerosine demand was down almost 9,000,000 bbl. for the 6-month period.

. . . **A crude-price increase** was overdue before the Suez crisis. Added costs from abnormal crude movements forced crude prices up.

. . . **The gasoline market** was in poor condition for a price rise, but light and heavy fuel prices could not be raised enough to cover higher crude costs.

. . . **Spot tanker rates** climbed during the European-shortage period. These increases added to the cost of delivering fuel to the East Coast.

. . . **Warmer-than-normal weather** made it possible for many electric-utility plants to use natural gas for boiler fuel throughout the winter.

. . . **Gasoline octane numbers** were raised.

. . . **The price differential** between regular and premium gasoline was raised on the Group 3 market and in most North Central areas.

Almost all of the gain in total demand for petroleum products in the first half was due to exports. Domestic demand for products in February and March averaged less than a year earlier. Exports had dropped back to near normal by May. Domestic demand was still below normal. The result: total May demand was lower than last year.

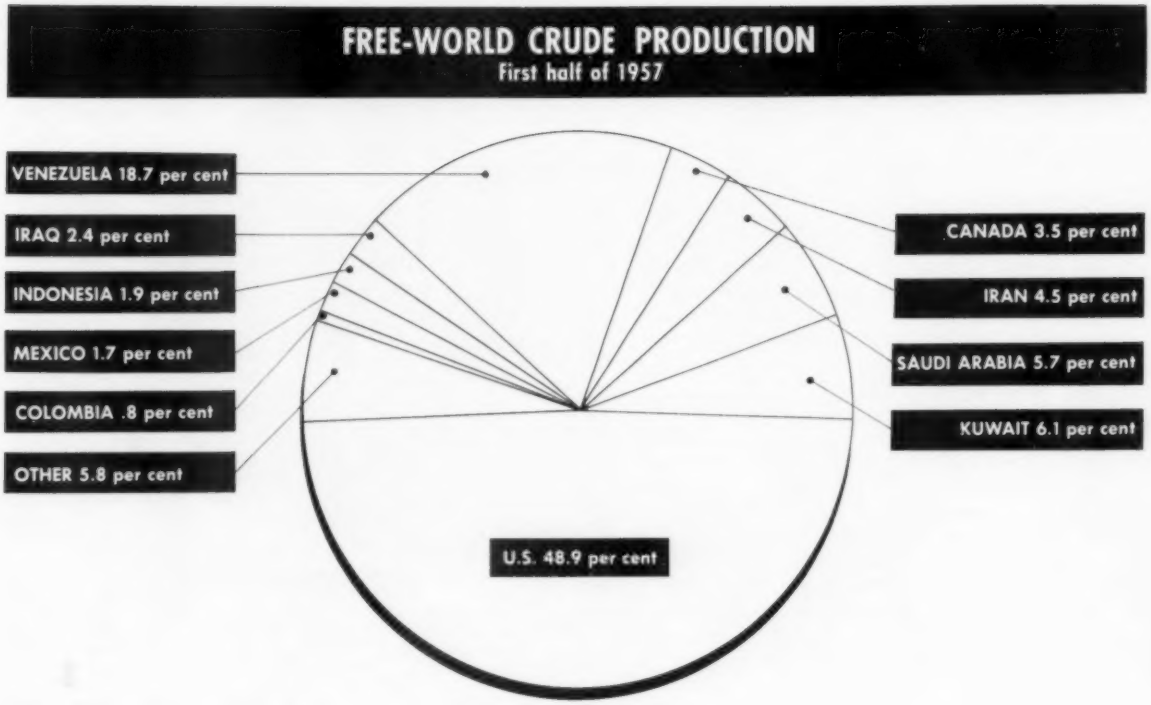
Gasoline-stock comparisons at the end of March may have been misleading. Poor motoring weather may have cut driving more than was expected. Total demand for gasoline in May showed little or no increase over May 1956.

The gasoline-stock increase at the end of June amounted to a little more than 10,000,000 bbl. There are two things that give importance to this increase. First, stocks were too high last year, probably by 10,000,000 bbl. It's not the gain but the total inventory surplus that puts pressure on markets. Second, demand has been lower than was expected.

No. 2 fuel prices are up slightly from last year both on the Gulf Coast and on the East Coast. Group 3 prices are back down to last year's of 8.75 cents a gallon. On the Gulf Coast, the low quotation at the end of June was 9.25 cents compared with 8.75 cents last year. The barge price in New York Harbor was 11.05 cents, up 0.70 cent from 10.35 cents last year.

Continuing increases in octane quality of motor fuels have reduced the value of natural gasoline as a blending component. This trend is showing up in natural-gasoline prices. The Group 3 price for Grade 26-70 dropped to 4.0 cents a gallon on May 6. If corrections are made for inflation, the average price paid for natural gasoline has been declining for the past several years.

Reductions in refinery runs in June represented the first step of a program to reduce oversupply of petroleum products. Better prices will return when supply and demand are more nearly in balance.


FREE-WORLD CRUDE PRODUCTION
First half of 1957
VENEZUELA 18.7 per cent
IRAQ 2.4 per cent
INDONESIA 1.9 per cent
MEXICO 1.7 per cent
COLOMBIA .8 per cent
OTHER 5.8 per cent
CANADA 3.5 per cent
IRAN 4.5 per cent
SAUDI ARABIA 5.7 per cent
KUWAIT 6.1 per cent
U.S. 48.9 per cent

United States bolsters total as . . .

Free world boosts crude production

FREE-WORLD crude-production the first half of 1957 made a fast comeback from the slashed level of late last year.

Output totaled 15,386,400 bbl. daily, up 3.9 per cent over the first half of 1956. This rise was made with the Suez Canal closed most of the period and with the Iraq-Mediterranean pipeline system reopening at only 40 per cent of capacity.

United States output to a large extent held up the world total, especially until relief from the Suez tieup. Domestic production reached a high of 7,717,000 bbl. daily in March. This tapered off to about 7,300,000 bbl. daily in June. The average of 7,525,000 bbl. daily was a gain of 5.0 per cent.

Venezuela also played a major role in delivering added crude supplies during crucial months. Operating companies averaged 2,885,000 bbl. daily, a gain of 22.1 per cent over the first 6 months of last year. By comparison, the rise the first half of 1956 over 1955 was 13.3 per cent.

Producers in Venezuela had more success in holding their gains than companies did in the United States, at least temporarily. Both countries reached a peak in March. But unlike the sharp drops in the United States, Venezuelan output fell off only 2,400 bbl. daily in April. It picked up 15,800 bbl. daily in May.

Canada continued its rapid rise in importance as a crude producer, averaging 530,600 bbl. daily. This was a 99,000-bbl. daily gain, up 22.9 per cent.

The Canadian and Venezuelan increases enabled the free world outside the United States to post a net gain of 2.8 per cent over the same period last year. This kept unbroken a trend of increasing foreign production that has continued for more than a decade.

Compared with the first half 10 years ago, foreign production has risen 210 per cent. Domestic output is up 48 per cent.

Middle East down . . . The Middle East as a whole produced 15.1 per cent less oil the first half. The 3,063,300-bbl. daily average was under the first 6 months 2 years ago. Despite the reduction, however, the Middle East still was a key source of world supplies, accounting for 39 per cent of total foreign production.

Iraq was the hardest hit producer. Its 365,000 bbl. daily was off 47.8 per cent from last year. Low point of the year came in February when output was 199,700 bbl. daily.

The only crude outlet then available for Iraqi exports was the shallow-draft port of Fao on the Persian Gulf. Export crude came from Zubair and Rumaila fields operated by Basrah Petroleum Co., an affiliate of Iraq Petroleum Co., Ltd. The fields produced 165,300 bbl. daily during the month.

By May, the partial reopening of the I.P.C. pipeline system permitted output to reach 415,000 bbl. daily.

Kuwait held onto the lead as the top Persian Gulf producer with an average of 940,000 bbl. daily. Its loss in crude output from a year ago was 19.7 per cent.

Production in Saudi Arabia averaged 880,000 bbl. daily, down 15.9 per cent. But by May production had passed the 1,000,000-bbl. daily mark again, reaching 1,099,300 bbl. daily. This was the second highest level on record.

Iran was the only major producing country to show

an increase. It averaged 685,000 bbl. daily, a gain of 35.1 per cent. This level was the best first half in the country's history. It exceeded the peak prenationalization period in 1950 by about 20,000 bbl. daily.

New fields open . . . Several new fields were opened to commercial production or were extensively expanded the first half.

The first tanker of Safaniya crude was lifted early in May, after completion of the 136-mile, 22-in. pipeline to Ras Tanura. Safaniya, lying for the most part under the Persian Gulf off northern Saudi Arabia, is probably the world's biggest underwater field. It opened at 50,000 bbl. daily. Output is now 125,000 bbl. daily. The crude is especially suitable for making fuel oil.

Petroleos Mexicanos is pressing the development of San Andres field, 10 miles southeast of the southern rim of Poza Rica production. Output rose from 5,000 bbl. daily in January to 20,000 bbl. daily at midyear. Fifteen rigs were running in the field, which produces 32°-gravity crude from about 11,000 ft.

Petroleo Brazilieros (Petrobras) more than tripled its output from Bahia fields over last year by opening expanded field gathering and terminal facilities for the old producing areas late last year. The country produced 22,500 bbl. daily, compared with 6,700 bbl. daily the first half in 1956.

Ragusa field in Sicily jumped by 3,000 bbl. daily to 21,000 bbl. daily after the opening of a 40-mile, 14-in. pipeline in May by Gulf Italia. The development of Ragusa, Italy's only sizable field, was responsible for increasing total Italian output to 22,600 bbl. daily from 9,200 bbl. daily last year.

Small countries push development . . . Several smaller countries made substantial gains, more important to the local economic health than to the world-wide picture.

Trinidad increased its output to 89,600 bbl. daily, a gain of 17.7 per cent. Egyptian production matched the level of last year. But development of Belayim field raised the country's output in recent months to the highest level in 4 years, offsetting declines in older production.

Companies in West Germany brought output to another high of 74,500 bbl. daily as the result of intensive exploration and development. Austria, replaced by West Germany as Europe's top producer last year, had another decline to 62,700 bbl. daily.

RELATIVE SHIFTS IN FREE WORLD PRODUCTION

(Per cent of total Free World)

	1957	1956	1955	1950
United States	48.9	48.4	50.3	56.6
Venezuela	18.8	16.0	15.7	15.8
Canada	3.4	2.9	2.3	0.8
Other W. Hemisphere	4.4	4.1	4.3	5.0
W. Europe and Africa*	1.7	1.6	1.0	0.9
Kuwait	6.1	7.9	8.2	3.5
Saudi Arabia	5.7	7.1	7.0	5.5
Iraq	2.4	4.7	5.0	1.3
Iran	4.4	3.4	2.2	7.4
Other Middle East	1.3	1.2	1.2	0.7
Other non-Communist Asia	2.9	2.7	2.8	2.5

*Excludes Austria in 1950 and 1955.

WORLD CRUDE-OIL PRODUCTION

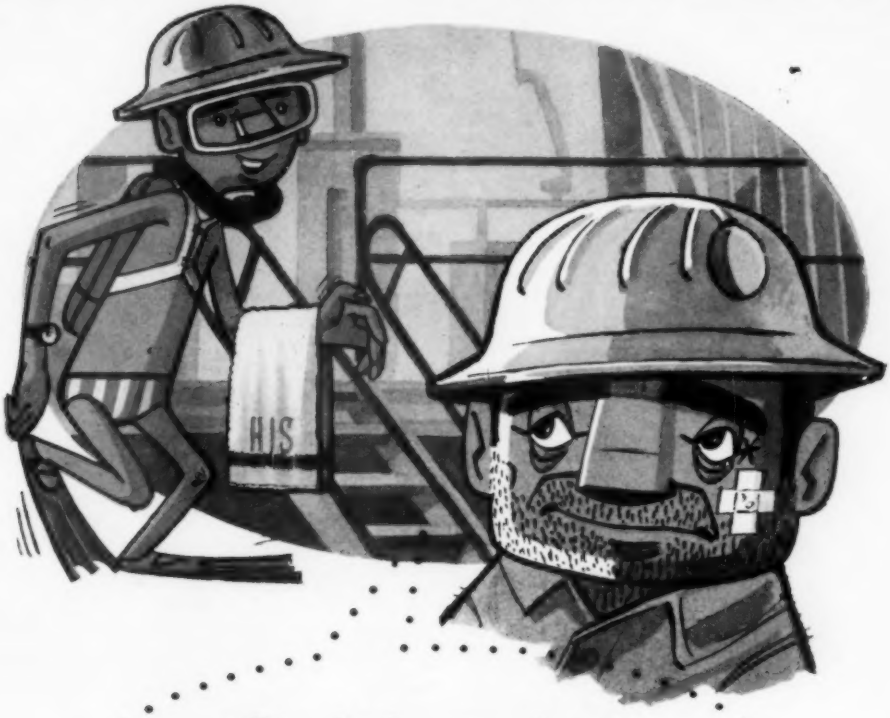
(Daily average in thousands of barrels)

	First 6 months			First 6 months
	1957	1956	Per cent change	1955
Western Hemisphere:				
Argentina	95.0	84.5	12.4	82.3
Bolivia	9.8	8.5	15.3	6.6
Brazil	22.5	6.7	235.8	5.0
Canada	530.6	431.6	22.9	314.2
Chile	11.0	9.1	20.9	6.2
Colombia	125.0	118.6	5.4	105.7
Cuba	1.1	1.5	—26.7	0.9
Ecuador	9.7	9.5	2.1	9.4
Mexico	255.0	246.9	3.3	251.9
Peru	51.9	47.9	8.3	47.1
Trinidad	89.6	76.1	17.7	66.4
Venezuela	2,885.0	2,362.9	22.1	2,110.3
Total	**4,086.2**	**3,403.8**	**20.0**	**3,006.0**
Western Europe and Africa:				
Algeria	0.4	0.8	—5.0	1.2
French Morocco	1.6	2.2	—27.3	2.3
Egypt	37.7	37.7	0	33.3
Austria	62.7	64.7	—3.1	68.2
France	28.0	22.2	26.1	14.2
West Germany	74.5	65.8	13.2	58.6
Italy	22.6	9.2	145.7	3.2
Netherlands	26.1	19.7	32.5	19.5
Turkey	6.5	5.0	30.0	2.7
United Kingdom	1.6	1.4	14.3	1.1
Yugoslavia	7.4	5.2	42.3	4.9
Total	**269.1**	**233.9**	**15.0**	**209.2**
Middle East:				
Bahrain	30.1	30.1	0	30.0
Iran*	685.0	507.0	35.1	292.0
Iraq†	365.0	700.1	—47.8	675.5
Israel	1.2	0.4	200.0	....
Kuwait	940.0	1,170.4	19.7	1,105.0
Neutral Zone	40.0	29.2	37.0	21.7
Qatar	122.0	125.0	—2.4	111.8
Saudi Arabia	880.0	1,047.1	—15.9	944.3
Total	**3,063.3**	**3,609.3**	**—15.1**	**3,180.3**
Other Asia:				
British Borneo	120.0	117.2	2.4	103.6
Burma	5.0	4.6	8.7	4.1
India	9.2	7.5	22.7	7.0
Indonesia	290.0	249.8	16.1	234.1
Japan	6.3	6.3	0	6.1
New Guinea	6.4	7.1	—9.9	10.6
Pakistan	5.9	5.8	1.7	5.5
Total	**442.8**	**398.3**	**11.2**	**371.0**
Total non-Communist foreign	7,861.4	7,645.3	2.8	6,766.5
United States	7,525.0	7,166.0	—5.0	6,773.3
Total Free World	**15,386.4**	**14,811.3**	**3.9**	**13,539.8**
Communist countries in Soviet Orbit:				
Romania	220.0	200.0	10.0	150.0
Russia	1,870.0	1,600.0	16.9	1,260.0
Other	50.0	50.0	0	36.8
Total	**2,140.0**	**1,850.0**	**15.7**	**1,446.8**
World total	**17,526.4**	**16,661.3**	**5.2**	**14,986.6**

First half production partially estimated on the basis of actual reports for most countries through April or May. Other Communist includes China, Czechoslovakia, Poland, Hungary, and Albania.

*Includes estimated 4,000 bbl. daily from Naft-i-Shah field not operated by consortium companies. †Includes estimated 5,000 bbl. daily from Naft Khaneh field, operated by British Petroleum Co.

Congrats and $25 to Jim Howard, Gardner-Denver Co., P. O. Box 35106, Dallas 19, Texas, for this quip.

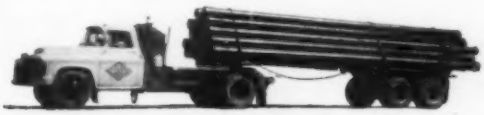


"Sez he's ready to check the water table."

Completely integrated facilities, from ore mines to finished product, plus quality control by accurate tests and inspections through each successive step of manufacture . . . guarantee the fine API quality of Lone Star pipe.

Construction of our new open hearth furnace and stretch-reducing mill is proceeding on schedule . . . which will mean Lone Star fully normalized casing, tubing and line pipe in greater quantity. Joe Roughneck can depend upon Lone Star . . . because Lone Star is specifically dedicated to supplying Joe's casing, tubing and line pipe needs.

Neighbor, wherever you are, specify Lone Star and we both get a good deal.



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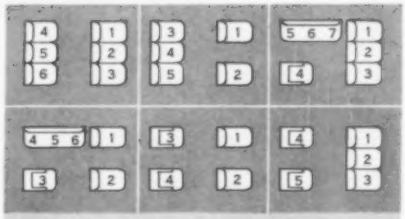
GET THERE FIRST IN A TWIN-BONANZA

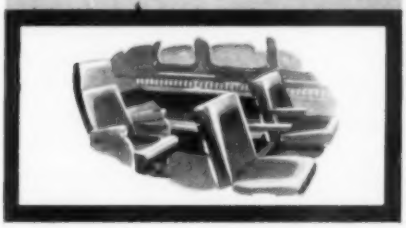
The big, beautiful Beechcraft Twin-Bonanza offers more for you than any other business airplane in the six-place field! Here are twelve of the dozens of ways in which the Twin-Bonanza is your best buy: (1) delivers more **power;** (2) has a higher recommended **cruising speed;** (3) carries more **payload;** (4) has greater **range;** (5) gives better **performance;** (6) is more **quiet;** (7) has better **visibility;** (8) compiles a better **safety** record; (9) comes **more fully equipped;** (10) has more **comfort** features; (11) **adapts better** to your individual needs; and (12) has a **higher resale value** than any other airplane in its class!

For complete information about the Twin-Bonanza and the finest financing plans in aviation, see your Beechcraft distributor or dealer, or write Beech Aircraft Corporation, Wichita 1, Kansas.



choose from six luxurious seating arrangements

Beautifully styled Twin-Bonanza interiors provide quiet and relaxation.



Six-place BEECHCRAFT Twin-Bonanza. Range — up to 1,650 miles. Speed — up to 240 miles per hour.

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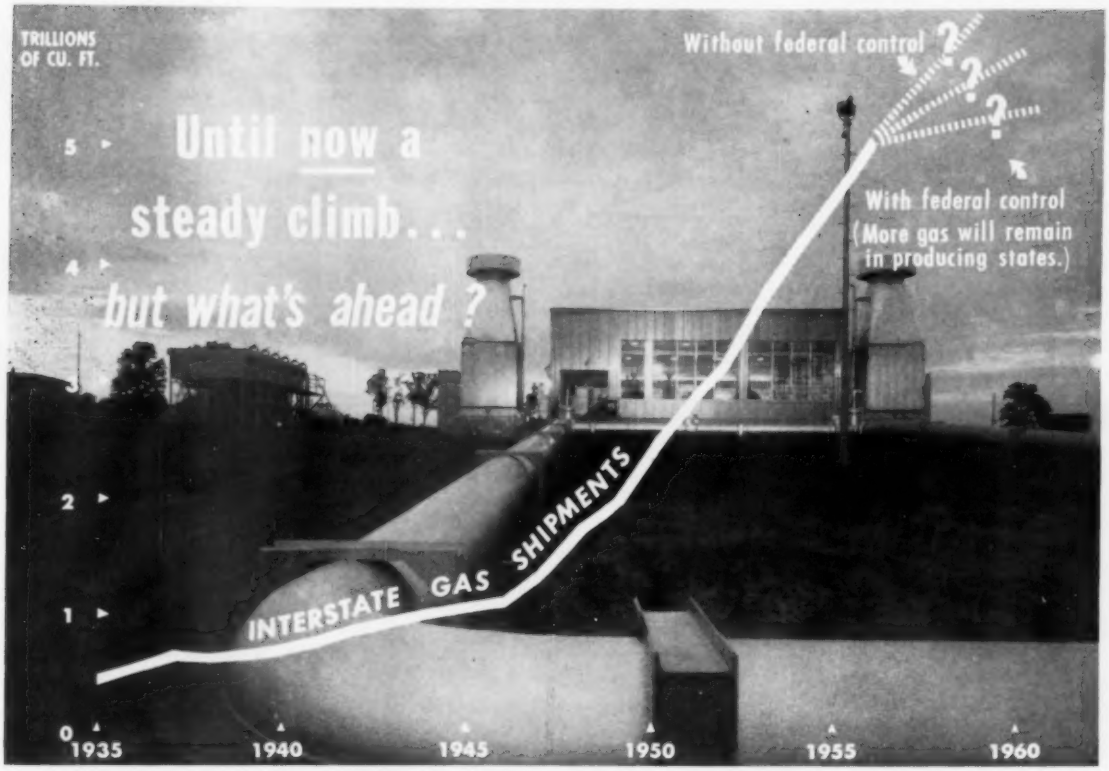
BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



It's still anybody's victory as . . .

Gas men hold firm in price fight

THE TUG OF WAR over the price of natural gas remained a virtual stalemate during the first half of 1957. But in the minor seesawings of the taut struggle, gas producers thought that their team gained a few inches, net. It began to look possible that a couple of good lunges might give them a referee's decision even though they may not drag their opponents through the creek in an ignominious rout.

The other team seemed a bit less hefty and stiff legged than the year before—though its cheering section was just as loud.

That other team is pulling for the utility school. Its curriculum teaches that the production of natural gas is a public utility, and the price at the wellhead should be regulated by the federal Government strictly on the basis of actual cost, like public-utility services.

The producers' team is pulling for the commodity school. Its doctrine is that the price of gas should be determined by competition in the market and through privately negotiated contracts, like all other commodities. It contends that pricing gas by a mathematical cost formula is not only impossible to achieve but ridiculous to attempt.

Anchor men on the utility team are the utility commissioners and city officials in states that consume but don't produce gas. Their teammates include those who think the price of gas ought to be forced down by any means, and those who think that the production of oil and gas is a monopoly anyway. Cheerleaders are the "liberal" columnists and politicians, who chant to the spectators in the bleachers that their gas bills will be much lower if the utility team wins.

The big weight on the producers' end of the rope is the gas itself. Producers say they won't sell much of it in interstate commerce if the Federal Power Commission is going to regulate them like utilities. They won't have the incentive to explore for gas vigorously, and what gas they do find will go to unregulated intrastate markets. So eastern consumers will have little gas after a while if they refuse to pay its commodity value.

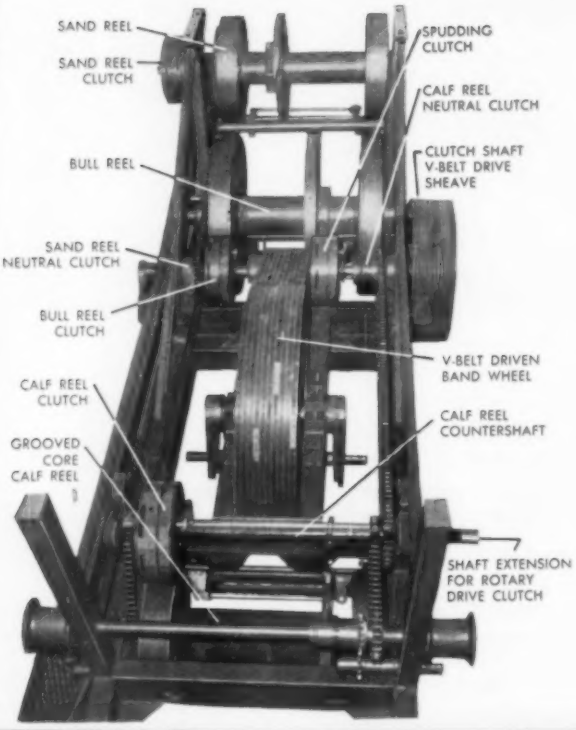
The rope in this tug of war is congressional legislation to modify the effects of the Phillips decision of June 1944 in which the Supreme Court said that the 1938 Natural Gas Act contemplated regulation of gas production on the same basis as its interstate transportation.

President Eisenhower gave a yank on the producers' end of the rope in January. In his budget message he told Congress it is essential to free producers from utility-type regulation. But he pulled with only one hand, while with the other he appeared to beckon on the other team with some vague remarks about retaining some consumer protection.

A month later FPC also threw some weight on the producers' end. Its annual report urged removing federal control from production as such and writing a new

NEW

WALKER-NEER SPUDDER MODEL S-46



Here is an important new spudder. It is similar in basic design to our Model S-43 which drills to 3,000 feet and works to 4,000 feet, and our Model S-310 which drills to 10,000 feet and works to 14,000 feet; these two models are described in Composite Catalog, pages 5314-5315.

The S-43, since its introduction at the Tulsa Oil Show in 1953, has been our most popular model, and we have received many requests for this same basic design in a 6,000-7,000-foot model.

The new S-46 is a most outstanding answer to these requests. It combines the unequalled versatility, the amazingly quiet operation, and other features made famous by the S-43 and S-310, with yet another major advancement—air clutches—as standard equipment.

Here is the S-46 in brief:

It's 3 Rigs In 1

1. 6,000′ TOP-TO-BOTTOM SPUDDER

FEATURES INCLUDE: Band-wheel spudding action, with heavy-duty V-belt drive from transmission to clutch shaft and from clutch shaft to band wheel. When drilling, no chain or gear is turning.

—Heavy-duty, full-width spudding beams with traveling spudding sheave and heel sheave.

—Improved *Tor-Shock* (Rubber Torsion) Shock Absorber with replaceable inserts; can be blocked out for deep drilling.

2. 7,000′ COMPLETION & WORKOVER SPUDDER

FEATURES INCLUDE: All drums full width, including a full width, grooved-core calf reel to insure proper spooling and long life for the casing line.

—All drums geared for maximum speed and maximum power.

—Separate countershaft to operate calf reel at any speed desired.

—Semi-full-floating sand reel with air clutch mounted on the drum shaft.

3. COMBINATION SPUDDER & ROTARY

The S-46 is designed for simple, low-cost installation of a rotary drive mechanism.

—The calf reel countershaft is extended and keywayed to take an air clutch for the rotary table drive.

—The rotary table drive can be furnished with the rig or installed later.

Famous S-43 Versatility – now in a bigger, air clutch spudder for 6000′ top-to-bottom drilling – 7000′ workover

The S-46 . . .

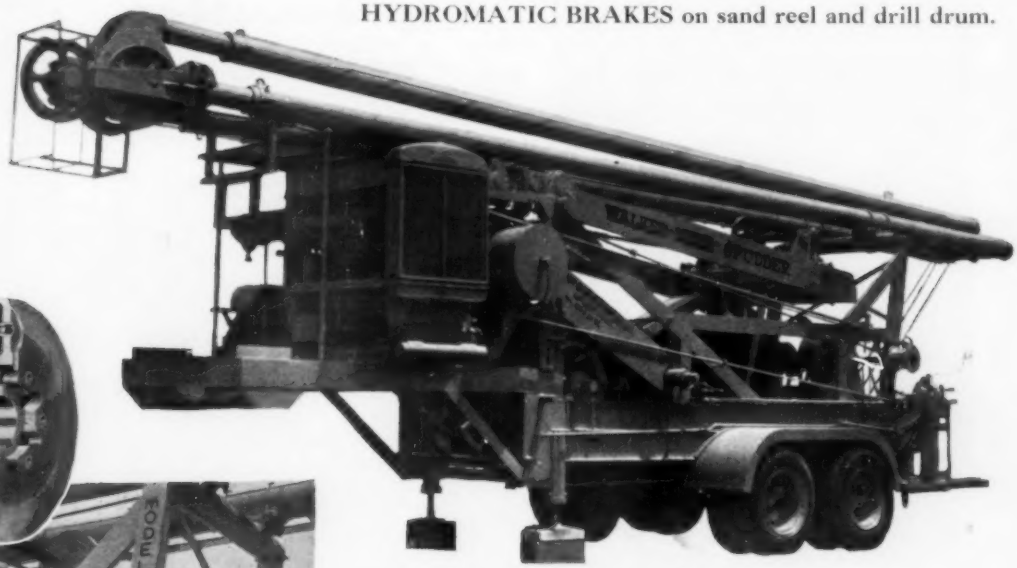
is semi-trailer mounted on high capacity tandem axles, with air brakes on one or both axles.

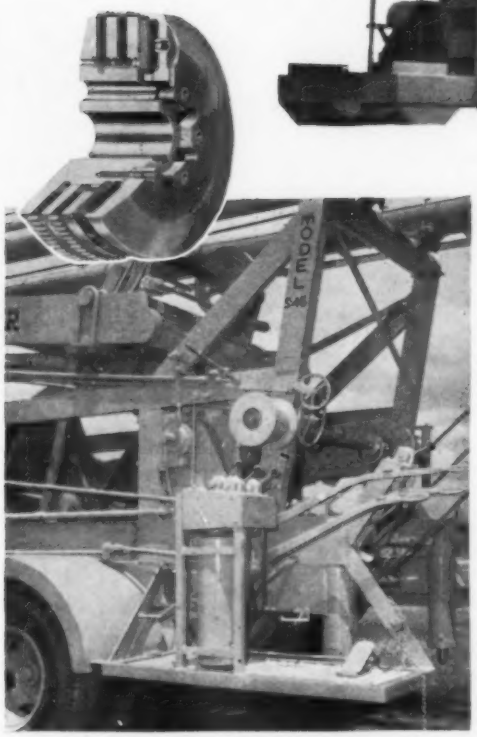
SEPARATE MAST RAISING DRUM—This rig is equipped with a worm-gear-driven power winch to raise, lower, and telescope the mast. To rig up, you simply adjust jacks to level the rig, raise the mast, and secure guy wires.

MAST—Standard mast is double telescoping tubular, 65 feet high under the sheaves, with 100,000-lb. capacity. With third leg as shown below, mast will handle up to 250,000 pounds. An 87-foot mast with fingerboard is available to rack drill pipe or tubing in doubles.

ENGINE—250 horsepower gas, gasoline, or diesel.
TRANSMISSION—Heavy-duty transmission with 4 speeds forward, 1 reverse.

HYDROMATIC BRAKES on sand reel and drill drum.





AIR CLUTCHES STANDARD

This feature represents a major advancement in efficient, trouble-free spudder operations. You get smooth engagement with no noise, shock, impact, or chatter . . . you get instant release. You "feel your load" as with mechanical disc clutches, yet with the ease of direct air control. Operation and upkeep are more trouble-free, with no adjustments and no lubrication required. Plates last much longer than with mechanical clutches. Owners of Walker-Neer air-clutch spudders are enthusiastic in their acclaim of this feature.

ROLLER AND BALL BEARINGS—All drums, masthead sheaves, clutches and adaptors are mounted on sealed self-aligning spherical roller and ball bearings.

Investigate this important model!
It's the latest and finest in spudders!

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WALKER-NEER SPUDDERS AROUND THE WORLD

MANUFACTURING COMPANY, INC.

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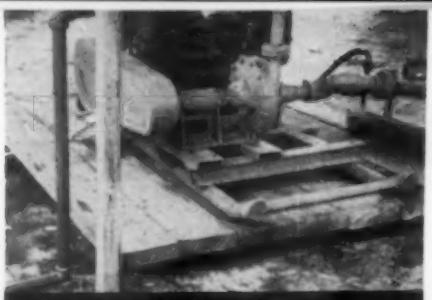
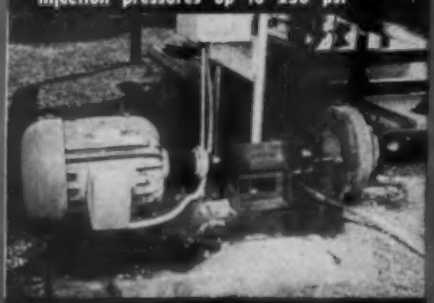


Water flood transfer pump

Single stage water flood injection pump

Mission Pumps connected in series for injection pressures up to 250 psi



Filter backwash pump

MISSION *Centrifugal* PUMPS

for oil field production service

- FILTER PUMPS
- FILTER BACKWASH PUMPS
- TRANSFER PUMPS
- SUPERCHARGING RECIPROCATING INJECTION PUMPS
- SALT WATER DISPOSAL PUMPS
- WATER FLOODING PUMPS

YOUR water flood or salt water disposal unit will operate more efficiently and economically when Mission Centrifugal Pumps are used.

Mission Centrifugal Pumps feature a concentric casing that minimizes turbulence and wear. They are built for rugged service and easy maintenance.

Replacement parts are stocked in all active oil regions, and are also available for fast delivery from the factory. Mission Centrifugal Pumps are supplied in cast iron, aluminum bronze and other alloys as required by individual situations.

Mission Centrifugal Pumps are backed by Mission guarantees of outstanding performance. Mission representatives are available in all oilfield areas for service and information.

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Export Office: 30 Rockefeller Plaza, New York.
Handled by representatives in all industrial areas . . .
and by supply stores in every oil country.

MISSION MANUFACTURING CO.
HOUSTON, TEXAS

"commodity value" standard for regulating the field price of gas purchased or produced by interstate pipelines.

These two boosts from the administration greatly cheered the producer team. But they also suggested a change of tactics.

Ever since the Phillips decision, most of the team had been pulling to get the entire legislative rope away from the utility boys by main strength and a straight-away haul. But they found this was an uphill pull, and it might take years to wear down the other team.

This year they decided to pull off at an angle, as suggested by FPC and the White House. Instead of holding out for complete freedom from regulation they would accept a limited amount of price supervision (if based on a commodity standard instead of the utility formula), and provided the federals kept their hands completely off all other aspects of the oil and gas-producing business.

The first lunge of this new tactic produced the Harris-O'Hara bill. This was introduced in April by the Democratic chairman and the ranking Republican member of the House interstate commerce committee. The bill was pretty much along the lines suggested by FPC and appeared to meet the President's objectives.

Some Players Change Sides

This new tactic brought encouraging results. The change in direction of pull shook some important members off the utility team. Some of them even joined the producer team. Chief among these were several eastern gas-distribution companies. Previously they had opposed any relaxation of the utility cost formula. Now they supported the H-O'H bill.

This result, it turned out, had taken a lot of planning and skull practice. For nearly a year an unofficial little group of gas producers, transporters, and retailers had been holding a quiet series of conferences. They wanted to break the stalemate in the tug of war without having either side dragged through the mud.

They compromised and they compromised; they discussed, argued, and cajoled. Finally they reached general agreement on the outlines of new legislation. Accidentally on purpose their draft fell into the hands of Chairman Harris. He discreetly talked it over in high places in Washington. He made a number of changes and had it drafted in legislative language. When he felt the time was ripe, the Harris-O'Hara bill was introduced.

Officially, everybody was surprised by the new bill. Actually, almost everybody had expected something like that.

The producer team went into a huddle over the new tactic. Should they abandon their old straight pull for no regulation at all? Would the promise of a partial victory be better than a continued stalemate? Would life in the gas business be worth living under the conditions of H-O'H?

Most of them said yes, albeit reluctantly.

The Independent Petroleum Association of America had a meeting about that time. The new bill was cussed and discussed from end to end. Nobody liked it much, but nearly everybody thought it was better than nothing. Those in the know warned that any attempt to amend it materially would upset the delicate balance of compromise, shake the new recruits off the producer team, and defeat the tactic of directional haul. The I.P.A.A. endorsed the bill.

Then came the convention of the Texas Independent Producers and Royalty Owners Association. They liked it less and said so louder. They proposed a series of amendments to make the bill more palatable to their taste. But they, too, agreed to pull in the new direction.

But hardly had the producers got a good grip on the new H-O'H rope than the White House threw a bucket of grease under their team's feet.

When committee hearings opened early in May a spokesman for the administration announced that the bill needed to be changed in two important ways: FPC should have the right to consider production costs in developing its proposed new commodity-value standard; and FPC also should be empowered to prevent increases in prices stipulated in contracts which had already been approved once.

At this, many producers threatened to quit the team. So did some of the new rookies recruited from the distributors. They said they'd rather continue the stalemate than win that kind of a rope.

As the hearings continued, the administration backed down. The White House said the amendments were desirable but not essential. More support built up for the bill, and by midyear it began to look as though Congress would give the decision to the commodity-value team and award them the Harris-O'Hara trophy.

If this is done, it will be only over the dead bodies of the anchor men on the utilities team, and their cheerleaders. The federal-regulation fans in the bleachers don't want any part of the H-O'H rules. They will be satisfied with nothing less than complete victory by seeing the producer team dragged through the mud in the time-honored manner of tugs of war.

It may take another year to decide the contest.

Meanwhile the producers have been putting a little grease under the utility team.

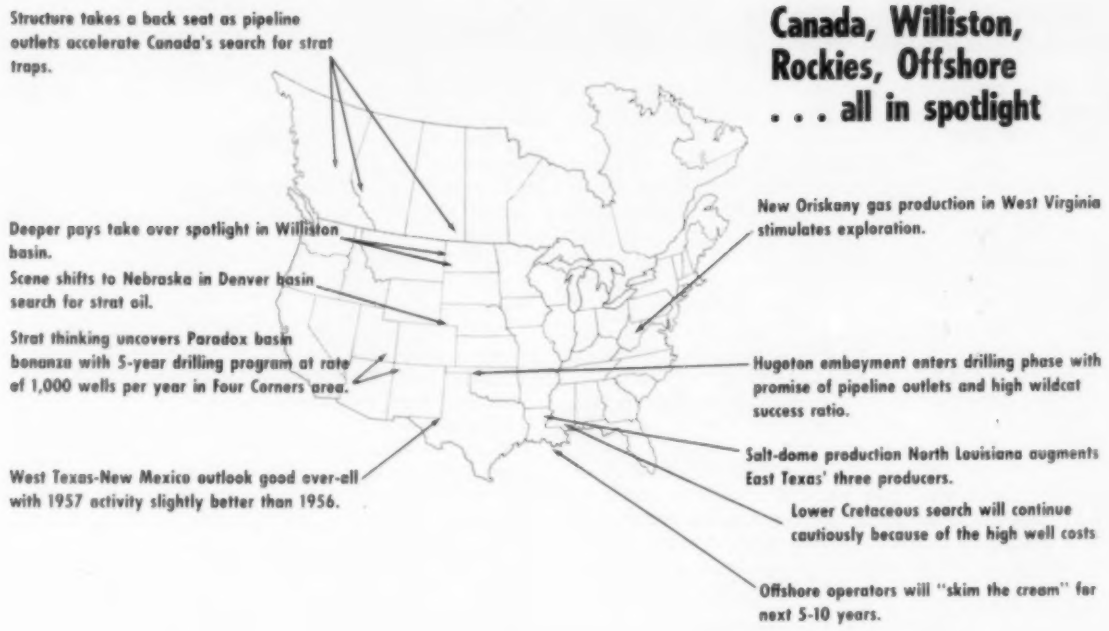
Without saying much about it, a good many of them have just not been selling much new gas to interstate pipelines where they can manage to hold it in the ground or find an intrastate market. Pipelines and their consumers aren't really hurting yet, but some of them are becoming concerned that their supplies will peter out unless they can offer what producers consider reasonable terms without FPC red tape and uncertainty.

Chalk Up One for Producers

The most dramatic lesson of this kind was taught by the C.A.T.C. Group. This group of four producers offered a big reserve of high-cost offshore gas at the highest field price on record. But Tennessee Gas Transmission Co. thought it was a bargain, and submitted the contract to FPC. Because the utility boys complained, FPC arbitrarily cut the price. The producers said it was no deal; they'd keep their gas, thank you. That called the bluff. FPC beat a hasty retreat, approved the contract price, and proclaimed that assurance of ample supply may serve consumers better than an artificially low price. Chalk one up for the producers.

On the cost-formula front the utility boys weren't doing well either. FPC did keep many contract escalations from taking effect because the applicants hadn't shown that the higher prices were justified by production costs. But in half a dozen pending big cases (such as Phillips Petroleum Co.) where producers undertook to show costs, preliminary figures made it appear that perhaps much gas is already being sold way below cost. No such case has been decided as yet, but it was becoming quite evident that development of a cost formula for gas production would take years of controversy and might actually bring higher, rather than lower, prices to consumers.

Producers were counting on such experiences to induce more recruits to pull with them on the Harris-O'Hara bill in this tug of war.


Canada, Williston, Rockies, Offshore . . . all in spotlight
Structure takes a back seat as pipeline outlets accelerate Canada's search for strat traps.
Deeper pays take over spotlight in Williston basin.
Scene shifts to Nebraska in Denver basin search for strat oil.
Strat thinking uncovers Paradox basin bonanza with 5-year drilling program at rate of 1,000 wells per year in Four Corners area.
West Texas-New Mexico outlook good over-all with 1957 activity slightly better than 1956.
New Oriskany gas production in West Virginia stimulates exploration.
Hugoton embayment enters drilling phase with promise of pipeline outlets and high wildcat success ratio.
Salt-dome production North Louisiana augments East Texas' three producers.
Lower Cretaceous search will continue cautiously because of the high well costs
Offshore operators will "skim the cream" for next 5-10 years.

Oil hunters were harried in first half, but . . .

Exploration picture is rose tinted

IMPORTS, bad weather, low allowables, and an excess producing capacity all have had ill effects on oil exploration and drilling in the first half of 1957. But the oil finder is armed with a new approach to exploration that makes the future look rosy indeed—facies studies that isolate stratigraphic traps.

Today in the United States and Canada, many of the most active areas produce from stratigraphic traps —Pembina, Paradox basin, Canada's latest reef trends, Bisti, northwest Oklahoma's Morrow trend. These fields are only the first of an impressive list of oil fields that mark the beginning of a new exploration era. With the emphasis on the stratigraphic approach, we can expect many more new oil fields to be found in the next few years that will swell the United States' oil reserves.

Canada . . . Apart from a mere handful of foothills oil and gas fields, the vast majority of Canadian production is from stratigraphic traps. The outlook is for increased production from this type of oil field. All the production in Southeast Saskatchewan is controlled by stratigraphy, with oil trapped at the Cretaceous-Mississippian unconformity. Eventually, this type of production will transgress the International Boundary, giving North Dakota a drilling boom comparable to that enjoyed by Saskatchewan during the past 2 years.

Reef production provided the percussion cap to ignite the Canadian drilling boom that started at Leduc in 1947. And now reef production again is taking over the exploration spotlight with new reef trends shaping up at Innisfail, Kaybob, Virginia Hills, and Swan Hills. Look for a surge in reef exploration with these new oil fields providing the necessary spark.

Six new oil discoveries in British Columbia in 1957 alone are converting the Peace River gas area into a true petroleum province with both oil and gas production. Already Act Oils, Ltd., a subsidiary of Canadian Southern Petroleums, Ltd., is studying a pipeline route to bring British Columbia's crude oil to a Pacific terminal. With a crude outlet assured, the search for oil in British Columbia will immediately quicken.

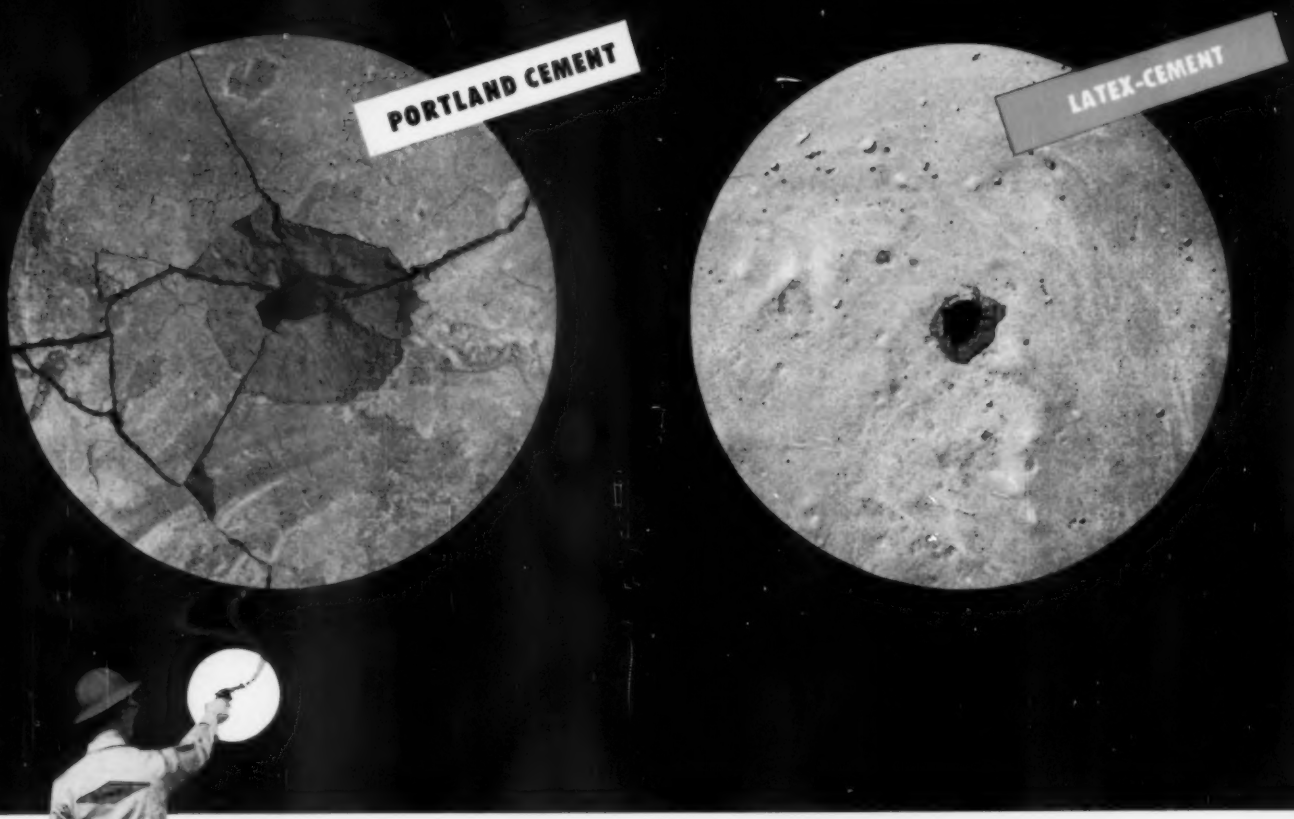
Drilling for gas reserves in the next year or two will be on the upswing, both in British Columbia and in Alberta. Westcoast Transmission Co., Ltd., plans to deliver Peace River gas to the Pacific Northwest by late September 1957. This will step up development drilling and the quest for new gas reserves, because the pipeline throughput will be 400 M.M.c.f.d., gradually increasing to 660 million.

Savanna Creek in the Alberta Rockies, highest oil or gas field in Canada, will witness a vigorous drilling campaign with the promise of a pipeline outlet.

Canada is in an enviable position. It is a young oil province, with a bare 10 years between the discovery of Leduc and the present. Once pipeline outlets are available, both oil and gas exploration and exploitation will increase markedly.

Rocky Mountains . . . The stratigraphic search has paid off handsomely in the Rockies with the discovery of the prolific Aneth trend in the Paradox basin of Southeast Utah. Bisti, in New Mexico, although overshadowed by Aneth, has convinced oil finders that oil reserves are abundantly present in Northwest New Mexico in Cretaceous rocks. The center of Rocky Mountain drilling and exploration for the balance of 1957 will be the Four Corners area.

Deeper pays are revitalizing the Williston basin along the Nesson anticline, where a deep-drilling campaign is slowly getting under way. And the Silurian



Here's one reason why CEALMENT has given better cement jobs

Most operators have had wells where perforating brought in unwanted gas and water in addition to desired oil production. Cement shattered by perforating shots could have been the cause. Costly squeeze jobs and re-perforating, with attendant rig time, are required to remedy the condition.

Cealment*, an exclusive Dowell service that utilizes latex-cement, helps you avoid many of the causes of faulty cement jobs. Latex-cement is more resilient than common Portland. That's why the man in the photograph could fire a 38-caliber revolver bullet through the latex-cement disk (right) without shattering it. The disk at left is common Portland cement after receiving the same treatment.

Laboratory tests and field experience indicate that the same thing may happen in your well. Cealment is especially useful for cementing a thin oil zone with gas or water nearby.

Resiliency is only one of many advantages of latex-cement. It bonds better, sets more dependably, and has shown excellent resistance to contamination by well fluids. More and more operators are finding that they are money ahead when they use Cealment.

For service, or for more information, call any of the 165 Dowell offices in the United States and Canada; in Venezuela, contact United Oilwell Service. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

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Services for the oil industry

DOWELL

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

and Ordovician discoveries in the Outlook area of Montana have provided a much-needed stimulus for exploration in the western part of the Williston basin. The results will be more deep drilling in the Williston.

Mid-Continent . . . Several exploration trends are shaping up in the Mid-Continent that will uncover new oil fields. Most significant is the search for gas reserves in the Hugoton embayment of Southwest Kansas, Northwest Oklahoma, and the Texas and Oklahoma panhandles. The promise of pipeline outlets, an abnormally high wildcat success ratio, and favorable economics are making gas exploration in the Hugoton embayment an attractive venture. Operators are now entering the drilling phase, proving up reserves, processing acreage, and extending known trends. Most of the gas production is from Pennsylvanian sands, the Mississippian limestone is developing into a significant oil reservoir in the old Hugoton gas field in Kearny County, Kansas. Lack of pipeline outlet deters active development of this promising new oil area. Limited data indicate that production is controlled by stratigraphy rather than structure.

Confirmation of deep Ordovician production on the sprawling Carter-Knox anticline in southern Oklahoma has kicked off an active drilling campaign for deep Ordovician gas-distillate reserves. Many of the deep-seated structures will be closely scrutinized for their Simpson potential in the next year or two. Admittedly the pay zones will be found at great depths, but the reserves and fairly rapid payouts help offset the risks.

The tight-money situation and the rainy spring have severely curtailed drilling in the shallow areas of both Oklahoma and Kansas, with the independents being hardest hit.

West Texas . . . Deep but prolific pays will keep West Texas in the forefront for exploration and drilling for the next several years. And the trend is toward ever deeper drilling in Pecos County. Here operators are trying to establish pre-Pennsylvanian production that will transform the Delaware basin into a sorely needed new oil domain. At the moment there are five tests drilling or planned in Pecos County that will probe below 16,000 ft.

West Texas is one of the few areas of the country to show a gain over 1956 drilling activity, and this trend should continue for the next 6-12 months.

Temporarily, at least, the Ellenburger has taken a back seat to the Devonian as a deep target in many parts of West Texas. Pennsylvanian and Permian pays, too, are attracting a fair share of the drilling and this trend will continue. Although the emphasis is still on deep structures, look for more successful Permian and Pennsylvanian drilling. Fracturing and stratigraphic studies will uncover many new oil fields or shallow pools in known deeper oil fields.

East Texas . . . Salt-dome production still has not materialized as rapidly as 1956 discoveries had indicated. Operators are proceding cautiously after some disappointing confirmation tests. Pan American Petroleum Corp. added another interior salt dome, Minden, to the producing column in North Louisiana. East Texas now has three producing salt domes—Bethel, Boggy Creek, and Hainesville, and the outlook for additional salt-dome production is good. The only problem is to find the oil, since most of the domes are already located.

Texas Gulf Coast . . . Offshore drilling appears to be on the upswing along the Texas Gulf Coast, but a really big discovery is needed to stimulate an intense drilling campaign. Old known salt domes still attract the bulk of the drilling on land, and this trend will continue for many years.

Louisiana . . . Offshore drilling shares top billing with the Aneth area in Utah as the nation's hot spots. Completions are up 50 per cent over the 1956 figures in offshore waters, and there is every reason to believe this trend will continue. At least 700 tests will be drilled off the Louisiana coast this year and the number will increase in 1958. Giant oil fields still are lying untapped off Louisiana's coast, and offshore expert estimates that one out of every five offshore fields will harbor at least 100 million barrels of oil or its equivalent in gas.

Offshore exploration accents structure with the huge salt domes and the as-yet-undrilled sea mounds. The province is a young one and this exploration trend will hold for several years. Since the offshore area is comparable in many respects to the adjacent land area, it is safe to forecast a prolonged drilling campaign for the next 5-10 years aimed at finding and developing the prolific salt domes.

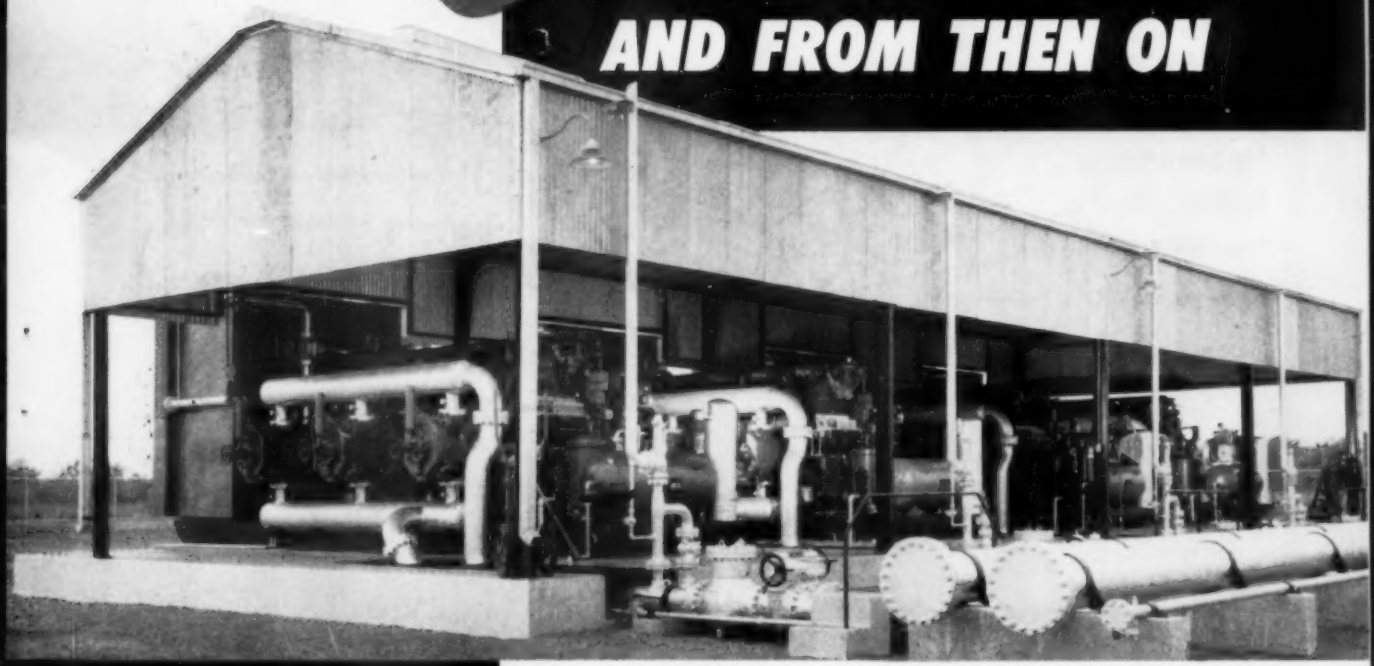
Southeastern United States . . . Look for a slight upsurge in deep drilling in Mississippi. Lower Cretaceous production at Citronelle, Bolton, and recent key discoveries have turned the spotlight on the deeper pay zones. As a result, most of the deep wildcats now are probing for Paluxy, Glen Rose, or Mooringsport pay zones rather than the shallower Tuscaloosa sand.

Exploration outlook . . . Oil finders know that the only successful way to explore for oil is to find giant oil fields. The small oil fields barely pay for themselves. And when you credit against them the nine dry holes that are drilled for every small oil field found, invariably you wind up in the red when looking for the little oil field. Unfortunately nearly all structural exploration using seismic work today is aimed at finding small oil fields, that is, fields with less than 15 million barrels of reserves and usually covering less than 320 acres. Profitable oil finding requires giant fields for success! Today, the giant oil field that can be mapped by geophysical methods is the exception. The vast majority of them have already been found.

But the only way to find big oil fields is to change the exploration approach from a structural search to a stratigraphic search. And this is exactly what is happening in the oil industry today. Stratigraphic traps are the answer for unearthing large reserves in today's exploration. Until recently, many of our stratigraphic traps were found accidentally. People who were endowed with more "intestinal fortitude" than sound exploration thinking drilled in spots that "couldn't produce." The classic example is East Texas. But now the concept is changing. You don't need a big structure to harbor a giant oil field. You don't even need a structure, all you need is an oil trap. An oil trap means a strat trap to most oil finders today.

What is going to result from this change in exploration approach? Only one thing, more oil and gas reserves, more giant oil fields. The stratigraphic search is not an easy way to find oil, because it means drilling a lot of wells. Even at best the geologist cannot hope to be right more often than once out of every 10 tries in looking for new oil fields. But with the reward of a major oil field a distinct possibility, oil companies will accent the stratigraphic approach for the next several years.

Save ON FIRST COSTS AND FROM THEN ON



Industrial Gas Supply Corporation, Needville, Texas, Compressor Station.

Southwest packaged gas compressors for main line stations

Illustrated above is an installation of four 660 hp Southwest-Cooper Bessemer GMXD-10 Packaged Compressors, handling Industrial Gas' total line capacity of 100 MMCF/D.

Southwest Packaged Gas Compressors for main line compression are **being** installed for **less than $200 per horsepower.** And they will be running months before field assembled units can be built!

Lower first costs are only part of the story. Unattended operation, possible with the automatic controls and safety devices on Southwest Packaged Compressor Plants, cuts operating cost per horsepower-hour to a fraction of the cost of a fully attended installation.

The final economy for your pipeline is that this station never need be shut down completely. In South Louisiana, the capacity of a main line station with eight 660 hp Southwest units, is reduced only 12½ per cent when one unit is down. However, if two 2600 hp units were used instead, capacity would be reduced 50 per cent when one unit is down.

These are all proved facts. Southwest engineers can show you the **results** and savings pipelines are realizing now with Southwest Packaged Gas Compressors.

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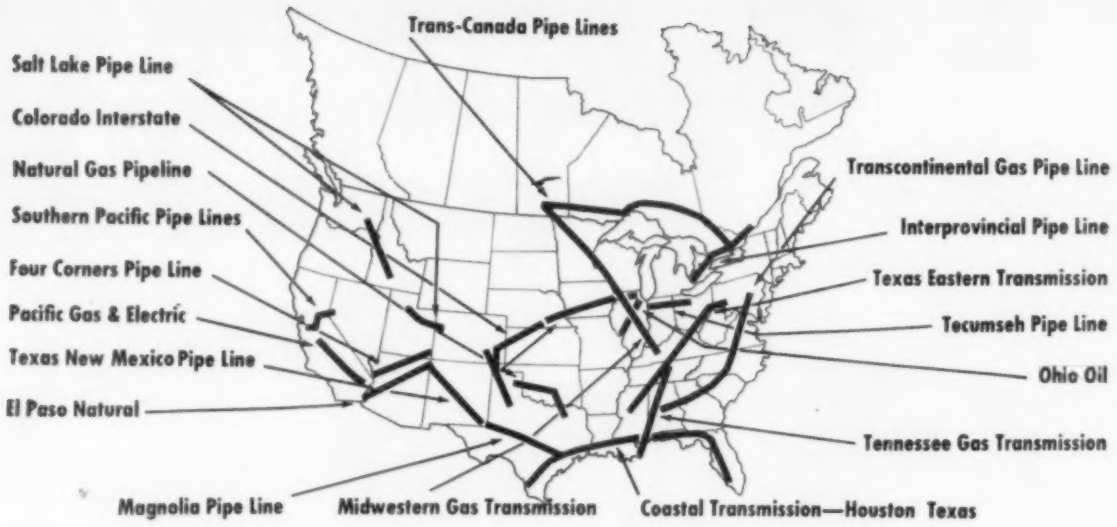


A glance at the map above shows why . . .

Pipelines are heading for record year

AFTER a slow start, pipeline construction in the United States has picked up sharply, and all signs point to a record year in total mileage put into the ground.

As usual, crosscountry gas lines account for the bulk of construction. But crude-line building, in the doldrums last year, is making a big comeback. And products construction is continuing at a high level. A midyear survey by The Oil and Gas Journal points to the following mileage totals for trunk and gathering lines in the United States this year:

. . . **Natural gas**—14,000 miles.
. . . **Crude oil**—5,500 miles.
. . . **Products**—3,000 miles.

The survey indicates natural gas will be some 1,400 miles above the 1957 record, crude construction is doubled, and products construction will be steady with last year.

The high level of construction prevails around the world, too. Canada, with its rapidly expanding industry, is having a big year in natural gas and crude construction. But this country has no products lines being built this year. Here are the indicated totals:

. . . **Canadian natural gas**—2,250 miles.
. . . **Canadian crude oil**—900 miles.

With the development of natural-gas resources, which has been retarded in most foreign countries, that phase of construction is stepping up. And new crude pipelines reflect new discoveries and increases in production being made to meet rising world demand. Products construction is on the wane as a result of the completion of the NATO pipelines in Europe. Construction outside the U. S. and Canada shapes up like this for 1957:

. . . **Foreign natural gas**—2,300 miles.
. . . **Foreign crude oil**—1,800 miles.
. . . **Foreign products**—1,650 miles.

U. S. Natural Gas

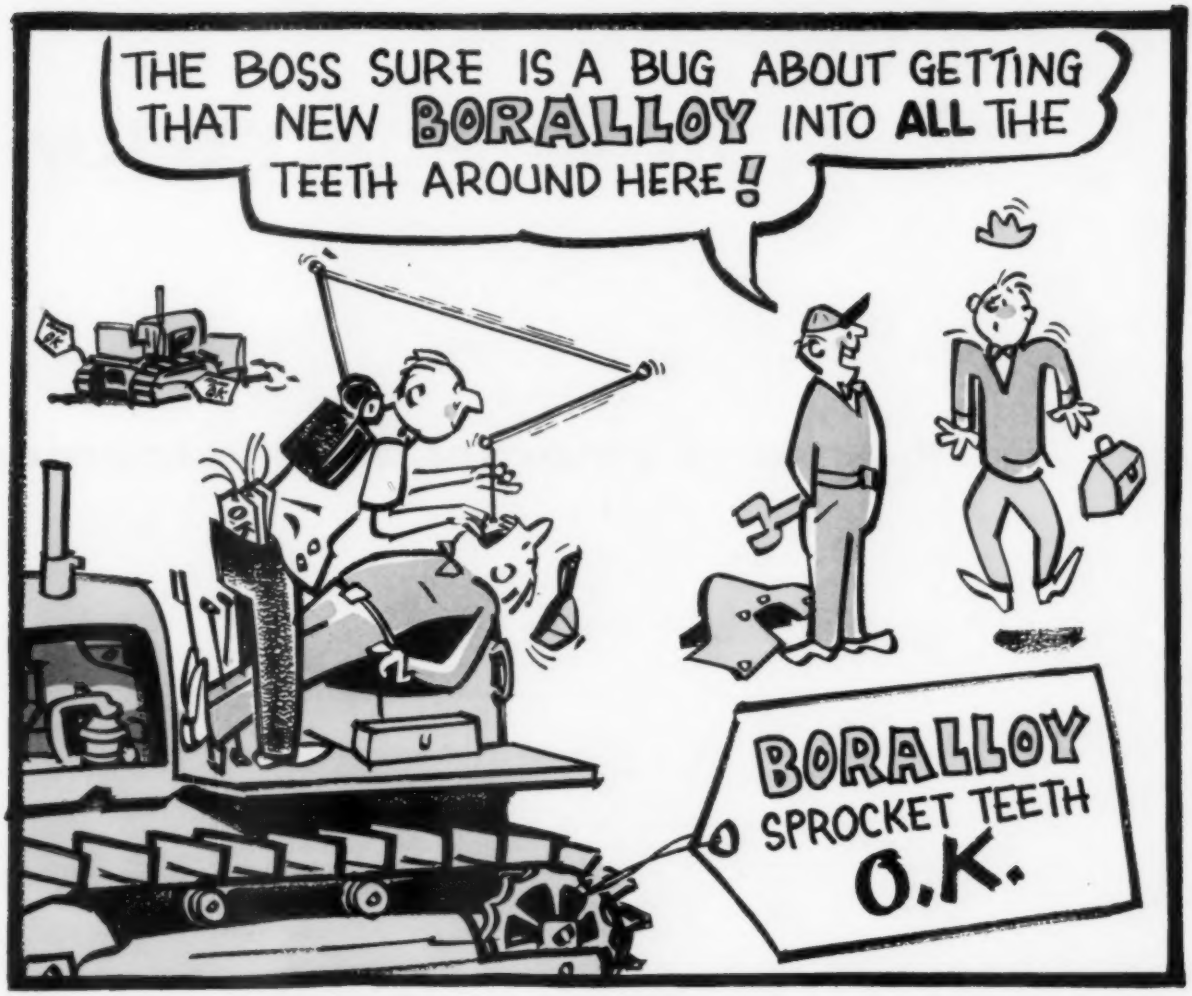
Expansions . . . Texas Eastern Transmission Corp. has the biggest trunk-line expansion in the industry this year. It involves more than 1,000 miles of 30-in. alone between McAllen, Tex., on the Mexican border, and Uniontown, Pa. The line to McAllen will introduce Mexican gas to the northeastern United States market. A large part of the looping on the Kosciusko-to-Uniontown line is being done to replace capacity lost in the conversion of the Little Inch gas line back to products.

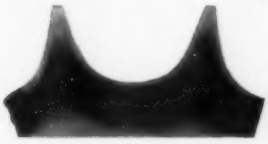
El Paso Natural Gas Co. will lay 1,500 miles of pipeline this year as it continues to expand its system from the San Juan and Permian basins to serve the growing California market.

Tennessee Gas Transmission Co., which builds the equivalent of a new pipeline each year, has its usual big expansion which could exceed 1,000 miles. Besides looping of its regular system and a new line to tap offshore gas reserves, T.G.T. has a big program in the hands of the Federal Power Commission to bring Gulf Coast and Canadian gas into the Midwest.

Plans involving thousands of miles of pipe will jell when FPC rules on competing applications of Midwestern Gas Transmission Co. (T.G.T. affiliate), Peoples Natural Gas Light & Coke Co., American Natural Gas Co., and Northern Natural Gas Co.

Trans-Continental Gas Pipe Line Corp. is laying around 500 miles of 24 to 36-in. pipe. Colorado Interstate Gas Co. plans more than 500 miles of lines, primarily 22 and 24-in. Columbia Gas Systems, Inc., also will lay more than 500 miles this year. Pacific Northwest Pipeline Corp. and Pacific Gas & Electric Co. have 400-mile programs. Southern California Gas Co. and Southern Counties Gas Co. will complete 252 miles of 30-in. in a joint project between the Arizona border and Los Angeles.





It increases sprocket life 50 to 100%! Got the name?—*Boralloy*. It's a new alloy which Caterpillar uses to make sprockets and replacement rims. It permits a minimum of 61% deeper hardening.

Result: CAT* BORALLOY sprocket teeth hold their contour longer. Teeth and track bushings *stay* in proper mesh, reducing wear and tear on all track running gear. Don't take chances. Get parts you can trust — see your Caterpillar Dealer today! Where else can you get the long-life benefits of Boralloy?

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QUICK FACTS on

Cooper-Bessemer's new...

V-Angle compressor development

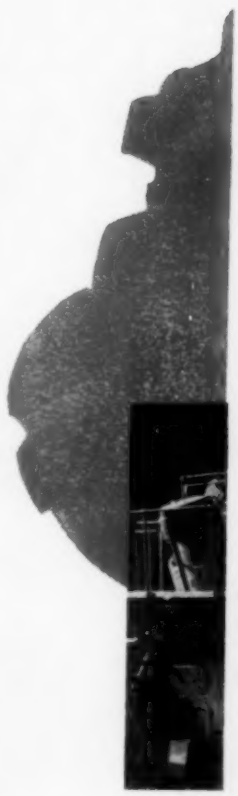
Cooper-Bessemer Series Turbocharging is a unique and two-fold advancement.

* *It offers a range of V-Angle compressors having greatly increased power and efficiency.*
* *It overcomes the inherent shortcomings of other and previous type gas engine supercharging systems.*

The accompanying diagram clearly shows the series arrangement of exhaust-driven and engine-driven air compressors, followed by aftercooling. It assures not only an abundant supply of properly cooled combustion and scavenging air, but also provides high efficiency turbocharging from the moment the engine starts and throughout *all* loads and speeds! At no time is the engine completely dependent on exhaust pressure or heat for its supercharging efficiency.

The net result is what counts! Series Turbocharging now assures at least 40% more power . . . much greater fuel economy . . . lower-than-ever cost per horsepower for housing, foundation, piping, supervision and maintenance . . . *full rated power* for high altitudes . . . and completely dependable, trouble-free performance, fully field-proved!

For further details on Series Turbocharged GMVC and GMWC V-Angles, from 720 to 3500 bhp, send for Bulletin ST-82 or contact the nearest Cooper-Bessemer office.



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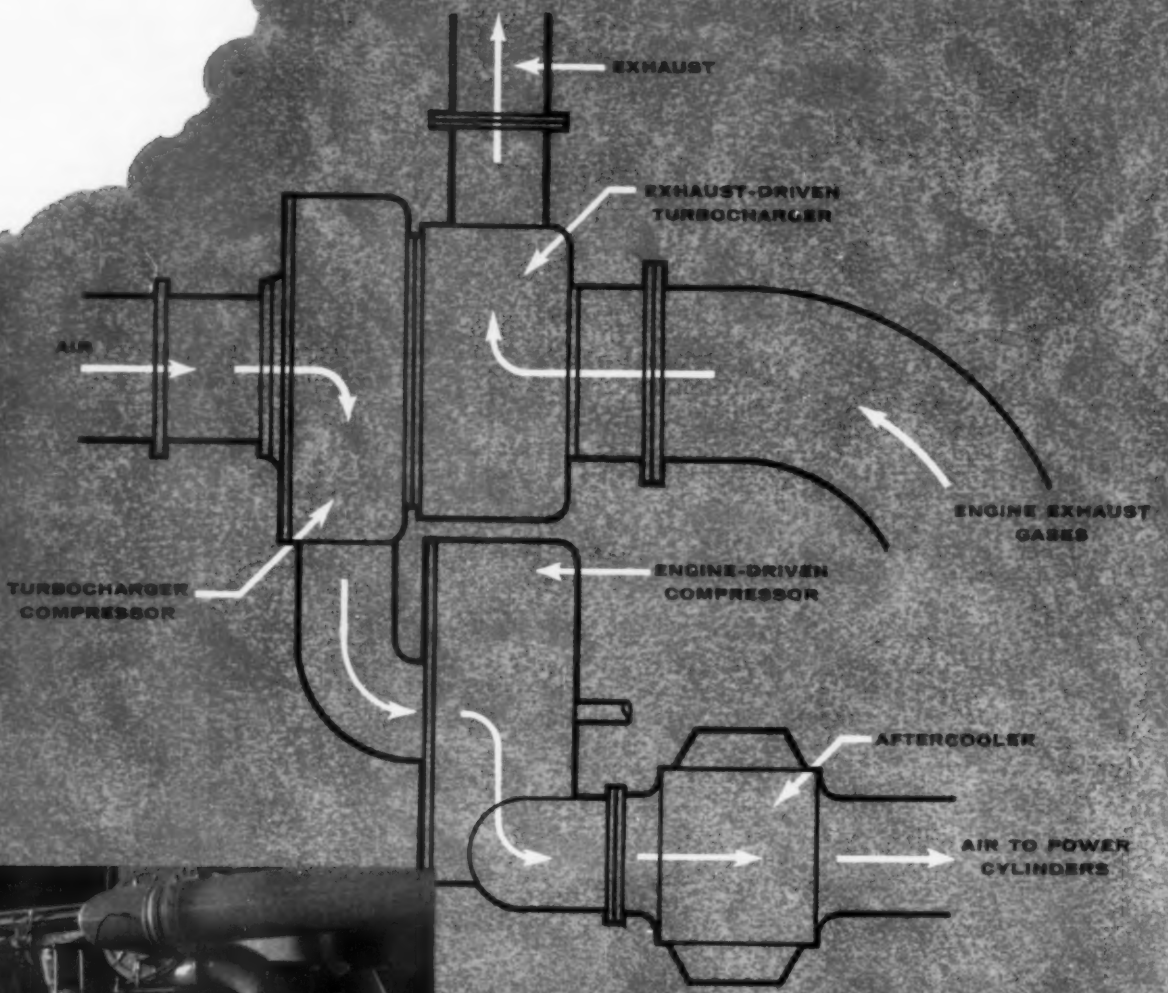

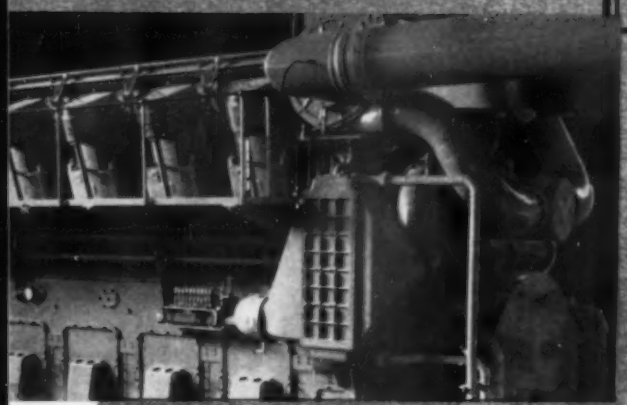

Operational Diagram of Cooper-Bessemer Series Turbocharging

New projects . . . Besides these expansion programs, which comprise the majority of 1957 construction, a few new projects are contributing to the record activity. The most significant project to start this year will transport gas from the lower Rio Grande Valley of Texas and fields in Louisiana to Florida. The McAllen, Tex.-Miami line involves more than 2,500 miles of pipe. The project will be built this year and next, with completion due next summer. Coastal Transmission Corp. will gather the gas and move it to Baton Rouge, La. Houston Texas Gas & Oil Corp. will build a line from Baton Rouge to Miami, opening the nation's last major market without natural gas.

North Carolina Natural Gas Corp., subsidiary of Colonial Natural Gas Corp., will lay 630 miles of 2 to 16-in. across North Carolina. Carolina Pipeline Co. has started its 177-mile interstate line between Blacksburg and Camden, S. C. The main line is 10-in. Both projects will take gas from Transcontinental Gas Pipe Line Corp.

U. S. Crude

Development of major discoveries in the Four Corners area of Arizona, New Mexico, Colorado, and Utah has been the greatest single stimulus to crude-pipeline construction this year. The two biggest projects of 1957 were spawned by the Bisti strike in northwestern New Mexico and Aneth in southeastern Utah. They will involve 1,150 miles of 16-in. main line.

Four Corners Pipe Line Co., owned by Shell Oil Co., Standard Oil Co. of California, Continental Pipe Line Co., Gulf Oil Corp., Richfield Oil Corp., and Superior Oil Co., is well under way on its 635-mile project from Aneth to Los Angeles. It will be completed this fall. Texas-New Mexico Pipe Line Co. will start laying pipe this fall on its 515-mile line from Four Corners southeast to Jal, N. M., where it will tie in with lines to the Mid-Continent and Gulf Coast. It will be completed next year.

Other major new projects are Tecumseh Pipe Line System, which will complete a 200-mile, 20-in. line from Griffith, Ind., to Cygnet, Ohio, this summer, and Muskegon Pipe Line Corp., which is laying 165 miles of 10-in. from Griffith to Muskegon, Mich. Tecumseh is a joint venture of Sinclair Pipe Line Co., Ashland Oil & Refining Co., and Pure Oil Co. Muskegon is owned by Service Pipe Line Co. and Aurora Gasoline Co.

Significant expansion programs include Magnolia Pipe Line Co., 203 miles of 12, 16, and 20-in. loops between Midland and Beaumont, Tex.; Pasotex Pipe Line Co., 134 miles completing the 20-in. loop between Wink and El Paso, Tex.; and Salt Lake Pipe Line Co., 100 miles of 10-in. loop between Rangely, Colo., and Salt Lake City.

Proposed new lines out of the Williston basin, southwestern Kansas, and West Texas are expected to materialize this year or next. The biggest of these projects would be Mustang Pipe Line Co., headed by Phillips Petroleum Co., which plans a big-inch line from the Midland area to the Gulf Coast near Houston.

U. S. Products

Southern Pacific Pipe Lines, Inc., and Great Lakes Pipe Line Co. have the biggest products expansion programs for the year. Southern Pacific is extending its line from the San Francisco area through Stockton, Sacramento, and Reno to Fallon, Nev. The extension includes 350 miles of 6 to 10-in. Great Lakes is laying some 400 miles of up to 12-in. to increase the capacity of certain sections and to enter two new markets—Eau Claire and Superior in Wisconsin.

The most significant event in products pipelining this year is the conversion of the wartime Little Big Inch back to products from natural gas. Texas Eastern Transmission Corp. is building a 231-mile, 14-in. line from the Little Inch to Seymour, Ind., through Indianapolis and into Chicago.

El Paso Natural Gas Co. will start this fall on construction of a 240-mile, 6-in. products line from its new Odessa refinery to El Paso, to be completed early next year. Cosden Petroleum Corp. will build a 155-mile, 6-in. line from Abilene to Wichita Falls, Tex.

The biggest new project to be announced this year—Laurel Pipe Line Co. from Philadelphia to Cleveland—won't get under way until 1958. The line will be 440 miles of 14 to 24-in. Another sizable project which is pending is Ohio Oil Co.'s 350-mile, 12-in. line from Wood River, Ill., to Chicago.

L.P.G. lines, to marketing terminals, refineries, and petrochemical plants, account for the bulk of products construction apart from the refined products lines mentioned.

Canada

This is a banner year in Canadian gas-line construction. Westcoast Transmission Co., Ltd., will complete its 650-mile, 30-in. line from Peace River fields to Sumas, Wash. And Trans-Canada Pipe Lines, Ltd., will lay more than 1,000 miles of 20, 24, 30, and 34-in., leaving only a gap in Ontario to be bridged in 1958 to complete the 2,250-mile line from Alberta to Montreal. These lines will afford the first major outlets for gas reserves of British Columbia and Alberta.

Interprovincial Pipe Line Co. and Trans Mountain Oil Pipe Line Co., Canada's two crude export outlets, both have sizable expansion programs. Interprovincial is looping part of its main line from Edmonton to Sarnia and is extending the line from Sarnia to Toronto with 156 miles of 20-in. Trans Mountain is nearing completion of 100 miles of 30-in. loop on the line from Edmonton to the Canada-Washington border.

Foreign

Natural-gas construction is stepping up in foreign countries, also. Venezuela is the scene of major projects by Cia. Shell de Venezuela and the Venezuelan Government. Shell is building a 177-mile, 20-in. line from La Paz field to the Cardon refinery where natural gas will fire furnaces which now burn fuel oil. The government line is 207 miles of 26-in. from Anaco to Caracas. Russia reports good progress on its goal of 1,500 miles of 14 to 28-in. gas-line construction this year. Argentina has more than 1,000 miles of gas line to be firmed up soon.

Crude-line construction is distributed over most of the world's major producing areas. Outstanding among these projects is the 211-mile, 20-in. line from the Barinas-Apure basin of Venezuela to Puerto Cabello on the Caribbean coast. Other major crude lines are expected to be firmed up this year or next in Venezuela, Colombia, Bolivia, Argentina, Algeria, the Middle East, Western Europe, and India. Russia expects to lay up to 1,000 miles of crude lines this year.

Foreign products lines are almost a rarity this year. The biggest project under way is the 2,300-mile Trans-Siberian crude and products line which Russia says it will complete in 1960. National Iranian Oil Co. has completed its 535-mile, 10-in. line from Abadan to Teheran. A lateral from Azna to Isfahan will be built next on this system. Chile will start a 75-mile, 10-in. line late this year and Argentina has a 500-mile products line in the works.

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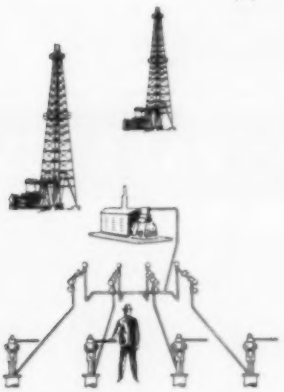

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Sargent builds every A.P.I. classified pump and pump parts plus a highly efficient long-stroking rodless bottom hole hydraulic pumping system. Through research, superior engineering, design and metals, Sargent builds bottom hole pumps to meet all deep oilwell pumping conditions.

You gain by using Sargent's superior quality which has been the Standard of Excellence since 1920, at competitive prices to meet and supply your pump needs.

Sargent pumps, both conventional or hydraulic, can be completely serviced in the field or by company trained experts in Sargent operated field stores.

"GOOD WILL" is the disposition of the pleased customer to return to the place where he has been well treated.
– U.S. Supreme Court

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The Journal reports at midyear on . . .

Refinery Construction

. . . in the United States and Canada

WHO • WHAT • WHERE • WHEN

A

Advance Refining Co., Inc. will increase crude capacity 3,000 bbl. per day at Centralia, Ill., by September 1, 1957.

Alaska-Yukon Refiners & Distributors, Ltd., will complete a $6,000,000, 7,500-bbl. per day refinery at Haines, Alaska, in 1958. It will include a 2,500-bbl.-daily thermal cracking unit.

American Oil Co. will increase Ultraforming capacity 21,000 bbl. per day, and Hydrofining (Ind.) capacity 22,000 bbl. per day at Texas City, Tex. Ralph M. Parsons Co. has contract.

At El Dorado, Ark. (formerly Pan-Am Southern Corp.'s plant), Ultraforming capacity will be upped 6,120 bbl. per day, and a 12,500-bbl. per day hydrodesulfurization unit (Ind.) added by January 1, 1958, by Lummus Co. at a cost of $3,000,000.

At Yorktown, Va., a 7,600-bbl. per day Ultraformer and a 22,600-bbl. per day hydrodesulfurization unit (Ind.) will be completed by Ralph M. Parsons Co. the last half of 1957. In 1958, crude capacity will be upped 25,000 bbl. per day, capacity of vacuum unit charging topped crude 16,400 bbl. per day, and a 12,000-bbl. per day straightrun asphalt unit added by M. W. Kellogg.

Atlantic Refining Co. is building a 2,100-bbl.-daily alkylation unit at Port Arthur, Tex., to operate in conjunction with a new 15,000-bbl. per day Catformer.

Atlas Processing Co. will build a 3,000-bbl. per day Penex (U.O.P.) isomerization unit at Shreveport, La.

B

Bankline Oil Co. will complete a $1,000,000, 4,000-bbl.-daily Sinclair-Baker unit and a 4,000-bbl.-daily hydrodesulfurization unit at Bakersfield, Calif., September 1957. Engineering is by D. Reynolds. An 800-bbl.-daily alkylation unit is being revamped by company staff at a cost of $500,000.

Ben Franklin Refining Co. let contract to Refinery Engineering Co. for a 1,000-bbl.-daily U.O.P. alkylation unit at Ardmore, Okla., to be completed late 1957.

British American Oil Co., Ltd. is adding a 4,000-bbl.-daily Atlantic Catformer at Edmonton, Alta. Lummus Co. will complete the unit by end of 1957.

At Clarkson, Ont., crude capacity will be upped 40,000 bbl. per day and capacity of vacuum unit charging topped crude 22,200 bbl. per day by M. W. Kellogg by late 1957.

At Port Moody, B. C., a 20,000-bbl. per day plant will be completed by Canadian Kellogg Co., Ltd., by late 1958. It will include atmospheric and vacuum crude distillation, Orthoflow, Catforming, catalytic cracking, alkylation, and hydrogen treating.

British Petroleum, Ltd., plans a $30,000,000, 30,000-bbl. per day plant at Ville d'Anjou, Que. It will include a 15,000-bbl. daily catalytic cracker, a 9,000-bbl.-daily catalytic reformer, a hydrogen-treating unit, and an alkylation unit.

C

Cal-Mex Oil & Refining Co. (subdivision of Vereinigte Petroleum Werke of West Germany) has let a $27,000,000 contract to Ralph M. Parsons Co. for a 20,000-bbl.-daily plant in the San Diego Calif., area. Plant, to be completed early 1959, will include a catalytic cracker, catalytic desulfurizer, catalytic reformer, and sulfur-recovery unit.

NEW VAPOR EQUIVALENT APPARATUS

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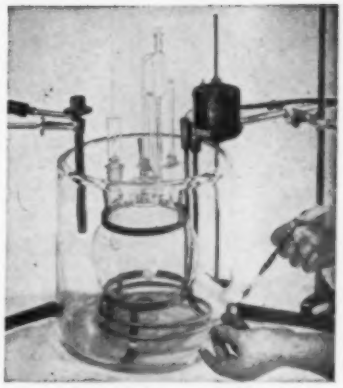
A new instrument which measures volume of vapor produced by a unit volume of liquid. Also determines molecular weights by an adaptation of the Victor Meyer method. Vapor equivalent determinations can be made of residues from natural gas samples, or of any liquid with a vapor pressure of more than 4mm. at the temperature of the vaporization bulb. Unit is compact, mounted within a glass constant temperature bath. Unit consists of a vaporization bulb with an integral multiplying manometer and a removable sample entry system consisting of an orifice and matching pycnometer. Bath is equipped with an electric heater.



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Canadian Oil Companies, Ltd., will increase Platforming capacity 4,400 bbl. per day, and add a 3,650-bbl.-daily Udex unit at Corunna, Ont., by August 1957. Fluor Corp. has contract to build the U.O.P.-enginered and designed units.

Canadian Petrofina, Ltd., will increase capacity at Montreal 10,000 bbl. per day.

Champlin Oil & Refining Co. will complete a 1,500-bbl.-daily Phillips hydrofluoric acid alkylation unit at Enid, Okla., March 1958. Badger Manufacturing Co. is contractor.

Chemoil Corp. will complete a new plant between New Orleans and Baton Rouge December 1958. It will have crude capacity of 22,000 bbl. per day, a 10,000-bbl.-daily vacuum unit to charge topped crude, a 14,000-bbl.-daily gas-oil cracker, a 5,000-bbl.-daily naphtha reformer, a 9,000-bbl.-daily delayed coker to produce 350 tons of coke per day, a 3,000-bbl.-daily hydrofluoric acid alkylation unit, a 1,000-bbl.-daily catalytic polymerization unit, and a hydrogenation unit.

Cities Service Oil Co., Ltd. is building a $22,000,000 plant at Toronto. Designed for ready expansion from initial 20,000-bbl.-daily capacity, it will include two-stage atmospheric and vacuum distillation, fluid catalytic cracking, catalytic reforming, and hydrodesulfurization. C. F. Braun Co. of Canada, Ltd., will complete the plant November 1957.

Cities Service Refining Corp. will increase crude capacity 15,000 bbl. per day by June 1958, and alkylation capacity 1,000 bbl. per day by September 1957, at Lake Charles, La.

Clark Oil & Refining Corp. will increase crude capacity 7,000 bbl. daily at Blue Island, Ill., by January 1, 1958. Capacity of vacuum unit to charge topped crude will be upped 8,000 bbl. per day by September 1, 1957. By March 1, 1958, a 15,000-bbl.-daily hydrofluoric acid alkylation unit will be completed at a cost of $7,250,000. The U.O.P. alkylation unit is being engineered by Dushell Engineering, Inc., and constructed by Morrison Construction Co.

Commerce Oil Refining Co. is building a $48,000,000, 30,000-bbl.-daily plant at Providence, R. I. Plant, to be completed in 1959 by Lummus Co., will include crude unit, catalytic cracking, catalytic reforming, catalytic polymerization, and alkylation.

Commonwealth Oil Refining Co. will up crude capacity 35,280 bbl. per day, capacity of vacuum unit charging topped crude 20,700 bbl. per day, Houdriflow 26,800 bbl. per day (50 per cent recycle), Houdriforming 3,730 bbl. per day, and catalytic polymerization 1,470 bbl. per day at Guayanilla, P. R., by September 1957. Lummus Co. is contractor.

Continental Oil Co. will complete a $1,000,000, 3,500-bbl.-daily catalytic reformer at Denver August 1957. Refinery Engineering Co. has contract.

At Westlake, La., a 10,000-bbl. per day delayed coker will be completed November 1957.

At Wichita Falls, Tex., a $1,500,000, 3,500-bbl.-daily catalytic reformer will be added by early 1958.

Cooperative Refinery Association will add a 3,500-bbl.-daily Unifiner and a 3,500-bbl.-daily Platformer at Phillipsburg, Kans., by December 1958, at a cost of $1,250,000. Southwestern Engineering Co. will build the U.O.P. units.

At Coffeyville, Kans., Refinery Engineering Co., will complete a 22,700-bbl.-daily U.O.P. hydrofluoric acid alkylation unit by early 1958.

D

Delta Refining Co. will up crude capacity 20,000 bbl. per day, capacity of vacuum unit charging topped crude 3,600 bbl. per day, thermal catalytic cracking 9,500 bbl. per day (16 per cent recycle), and add an 860-bbl.-daily catalytic polymerization unit at Memphis, Tenn., by December 1957.

Douglas Oil Co. will up crude capacity 12,000 bbl. per day at Bakersfield, Calif., by December 1957.

D-X Sunray Oil Co. will complete a 6,000-bbl.-daily Unifiner at Duncan, Okla., in 1958. Refinery Engineering Co. has contract.

At West Tulsa, Okla., Refinery Engineering Co. will complete a 12,000-bbl.-daily Platformer, a 20,000-bbl.-daily Unifiner, a 3,000-bbl.-daily hydrofluoric acid alkylation unit, and add 2,000 bbl. per day butane isomerization capacity in 1958.

E

El Paso Natural Gas Products Co. will complete a $10,000,000, 6,500-bbl.-daily plant near Gallup, N. M., November 1957. It will include Platforming, fluid catalytic cracking, a vacuum unit, and a hydrofluoric acid alkylation unit. Southwestern Engineering Co. has contract.

At Odessa, Tex., a 6,500-bbl.-daily plant including crude, vacuum, catalytic cracking, gas concentration, Platforming, and hydrofluoric acid alkylation units, will be completed April 1958.

Esso Standard Oil Co. will increase gas-oil cracking capacity 5,000 bbl. per day and lube production 150 bbl. per day at Baton Rouge by December 1957.

At Everett, Mass., a 7,200-bbl.-daily Powerformer and a 7,200-bbl.-daily Hydrofining unit will be completed August 15, 1957. Blaw-Knox has contract for Powerformer.

At Linden, N. J., Ralph M. Parsons Co.

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will complete a 10,230-bbl.-daily sulfuric acid alkylation unit November 1957.

Evangeline Refining Co., Inc., will add a 1,000-bbl.-daily Catformer at Jennings, La.

F

Farmers Union Central Exchange will complete a 4,400-bbl.-daily Platformer and a 12,200-bbl.-daily Unifiner at Laurel, Mont., March 1958. Cost is $3,000,000.

Fletcher Oil Co. will complete a 3,000-bbl. daily Platformer and a 3,000-bbl.-daily Unifiner April 1958, at Wilmington, Calif.

Frontier Refining Co. plans to expand capacity at Cheyenne, Wyo., 5,500 bbl. daily and to double asphalt capacity to 10,000 bbl. daily.

G

General Petroleum Corp. will complete an $8,000,000, 12,000-bbl.-daily Sovaformer at Torrance, Calif., October 1957. Engineering is by Socony Mobil Oil Co., Inc., and Bechtel Corp.; construction by Ralph M. Parsons Co.

At Ferndale, Wash., Bechtel Corp. will complete a $7,000,000, 9,000-bbl.-daily Sovaformer September 1957.

Golden Bear Oil Co. is considering adding furfural extraction capacity and modernizing acid-treating facilities at Oildale, Calif. Plans include adding 500 bbl. daily hydrogen-treating capacity at a cost of $350,000.

Gulf Oil Corp. will increase Platforming capacity 26,000 bbl. per day at Port Arthur, Tex., by early 1958.

Gulf plans to build a pentane isomerization unit (Penex) soon, probably on the Gulf Coast.

At Philadelphia, Ralph M. Parsons Co. will complete a 3,500-bbl.-daily sulfuric acid alkylation unit in August 1957. Platforming capacity will be upped 52,000 bbl. per day in 1958. Platformer engineering and design are by Procon, Inc., and U.O.P.

Construction of a new plant near Charleston, S. C., is being considered. Acreage has been bought.

H

Hancock Oil Co. is increasing crude capacity 7,000 bbl. per day, visbreaking 3,450 bbl. per day, and thermal catalytic cracking 2,100 bbl. per day at Signal Hill, Calif. Ralph M. Parsons Co. has contract.

Humble Oil & Refining Co. will complete two hydrodesulfurization units with 90,000-bbl.-daily capacity at Baytown, Tex., by January 1, 1958. Ralph M. Parsons has contract. A 55,000-bbl. per day Humble fluid catalytic cracker (no recycle) will be completed February 1, 1958, by Foster Wheeler Corp.

Husky Oil & Refining, Ltd., has indefinite plans for crude expansion at Lloydminster, Alta.

Crude expansion and a new diesulforming unit are planned for Fort William, Ont.

Crude expansion is planned for Moose Jaw, Sask., but plans are incomplete.

I

Imperial Oil, Ltd., will complete a 5,800-bbl.-daily Powerformer at Ioco, B. C., December 1957. A prefractionator and Hydrofiner will be added. Cost will be $4,000,000. Canadian Bechtel, Ltd., has contract.

At Calgary, Alta., plant capacity will be expanded to 18,500 bbl. per day in a $17,000,000 expansion and modernization program.

At Winnipeg, Man., crude capacity will be upped 2,650 bbl. per day, and fluid catalytic cracking 1,500 bbl. per day (23 per cent recycle) in last half 1957. A 3,150-bbl.-daily Powerformer will be completed October 1957, by Foster Wheeler Corp.

K

Kerr-McGee Oil Industries, Inc., will complete a 5,500-bbl.-daily U.O.P. Platformer and a 4,000-bbl.-daily U.O.P. Unifiner at Wynnewood, Okla., July 1, 1958. Cost is $4,000,000. Refinery Engineering Co. has contract.

L

Lake Charles Chemical Corp. will complete September 15, 1957, a 10,000-bbl.-daily delayed coker to produce 330 tons per day of coke at Westlake, La. Fluor Corp., Ltd., is contractor.

Lake Superior Refining Co. will increase crude capacity 3,500 bbl. per day, Platforming 1,000 bbl. per day, and add a 4,300-bbl. per day Unifiner at Superior, Wis., by October 15, 1957.

M

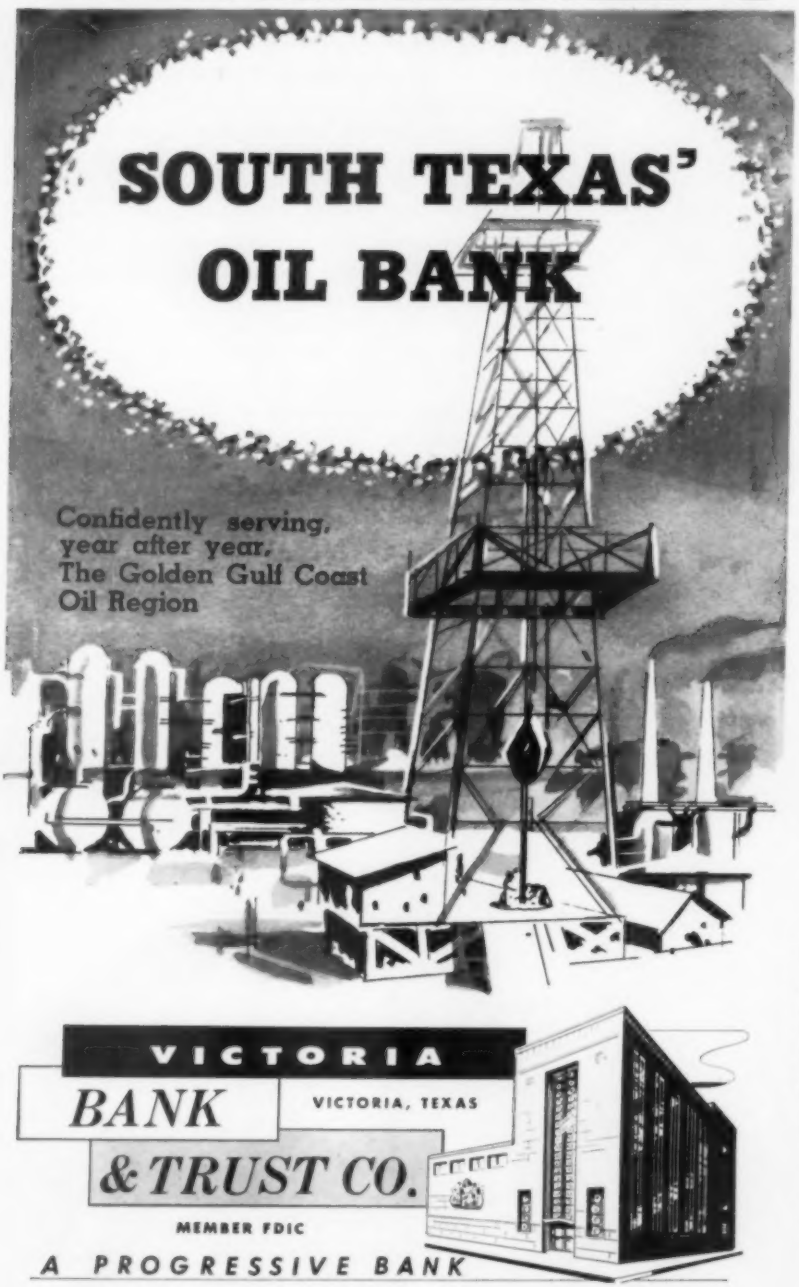
Magnolia Petroleum Co. will complete a 100,000-bbl.-daily atmospheric distillation unit and a 32,000-bbl.-daily vacuum unit charging topped crude (both to replace some existing capacities) at Beaumont, Tex., by March 1958. Foster Wheeler Corp. is contractor. A 30,000-bbl.-daily Sovafiner will be completed and sulfuric acid alkylation capacity increased 8,000 bbl. per day by March 1958. Engineering and construction are by C. F. Braun & Co.

McColl-Frontenac Oil Co., Ltd., will complete a 10,000-bbl.-daily Hydrotreating unit at Montreal East, Que., late 1957.

McMurrey Refining Co. will increase Platforming capacity 5,200 bbl. daily and add a 3,200-bbl.-daily Unifiner at Tyler, Tex., by June 1958.

N

Naph-Sol Refining Co. will increase crude



capacity 3,500 bbl. per day at Muskegon, Mich., by October 1, 1957.

North American Petroleum Corp. has bought site for a new plant at Corpus Christi. Construction has not started.

P

Paragon Oil Co. plans a plant at Riverton, R. I.

Pacific Petroleums, Ltd., and **Phillips Petroleum Co.** are building a $15,000,000 refinery at Taylor, B. C. It will include distillation, catalytic desulfurization and reforming, dehydrogenation, butane isomerization, and alkylation. Pacific will operate plant.

Phillips Petroleum Co. will complete a 16,000-bbl.-daily reforming unit and desulfurization facilities at Sweeny, Tex., January 1, 1958. Cost is $4,000,000. Fluor Corp., Ltd., has contract.

At Woods Cross, Utah, a 3,700-bbl.-daily catalytic reformer will be completed spring 1958, by Procon, Inc.

Pontiac Eastern Corp. will complete an 11,000-bbl.-daily plant at Hattiesburg, Miss., September 1957. The plant, being engineered and built by Fluor Corp., Ltd., will include a 3,500-bbl.-daily fractionator, a 4,800-bbl.-daily fluid coker to produce 225 tons per day of coke, a 25,700-bbl.-daily thermal catalytic cracker (63 per cent recycle), a 2,500-bbl.-daily sulfuric acid alkylation unit, a 1,200-bbl.-daily Unifiner, and a 2,500-bbl.-daily Platformer.

Pure Oil Co. will add a 12,000-bbl.-daily Sinclair-Baker catalytic reformer and a 17,000-bbl.-daily Kellogg unit at Lemont, Ill., by fall 1957. M. W. Kellogg Co. has contract.

R

Regent Refining (Canada), Ltd., will increase crude capacity 20,000 bbl. per day, add an 8,000-bbl.-daily vacuum unit to charge topped crude, an 11,300-bbl.-daily fluid catalytic cracker (61.5 per cent recycle), and a 730-bbl. per day catalytic polymerization unit at Port Credit, Ont., by summer 1957. Engineering and design are by Procon (Canada), Ltd., and U.O.P.

Richfield Oil Corp. plans a new $50,000,000 refinery at Everett, Wash. Probable completion date will be in 1965.

Rock Island Refining Corp. will increase Platformer capacity 400 bbl. per day and Unifining capacity 4,600 bbl. per day at Indianapolis by August 1, 1957.

Rothschild Oil Co. is adding an 8,000-bbl. per day catalytic cracking unit at Santa Fe Springs, Calif., at a cost of $2,000,000. C. F. Braun & Co. has contract.

Royalite Oil Co., Ltd., will complete a 1,000-bbl.-daily Platformer and a 1,500-bbl.-daily Unifiner at Kamloops, B. C., October 1957.

At Saskatoon, Sask., crude capacity will be increased 500 bbl. daily by August 1957.

At Mildred Lake, Alta., a $50,000,000, 20,000-bbl.-daily separation plant to process Athabasca oil sands will be completed in 1960, by Caribou Engineering Co.

S

Salt Lake Refining Co. will add a 6,000-bbl.-daily Platformer at Salt Lake City, by November 1957.

Seminole Oil Co. has indefinite plans for a refinery at Fort Pierce, Fla., to be operated by Frontier Refining Co.

Shamrock Oil & Gas Corp. will increase sulfuric acid alkylation 1,100 bbl. daily by fall 1957, at Sunray, Tex. Catalytic Construction Co. has contract.

Shell Oil Co. will complete a 12,000-bbl.-daily Platformer at Norco, La., summer 1958. Foster Wheeler Corp. and J. F. Pritchard Co. will build auxiliary facilities.

At Anacortes, Wash., a multimillion-dollar, 2,400-bbl.-daily alkylation unit will be built by Fluor Corp.

At Wilmington, Calif., a 16,000-bbl.-daily Platformer is being built by Kaiser Engineers.

Shell Oil Co. of Canada, Ltd., will add a $3,000,00, 1,500-bbl.-daily sulfuric acid alkylation unit at Montreal East, Que., in 1958. Refinery Engineering, Ltd., has contract.

Sinclair Refining Co. will increase Hydrofining capacity 24,000 bbl. daily at Houston by September 1, 1957. Ralph M. Parsons Co. is contractor.

Skelly Oil Co. will complete a 3,500-bbl.-daily Phillips hydrofluoric acid alkylation unit at El Dorado, Kans., spring 1958. Engineering and construction are by Skelly personnel.

Socony Mobil Oil Co., Inc., will complete a 9,000-bbl.-daily catalytic reformer at Augusta, Kans., August 1957. J. F. Pritchard Co. is contractor.

At Trenton, Mich., a 3,500-bbl. per day sulfuric acid alkylation unit will be completed December 1957, by Fluor Corp., Ltd.

At Casper, Wyo., a 3,000-bbl.-daily catalytic reformer and a 3,250-bbl.-daily hydrodesulfurization unit will be completed November 1957, by J. F. Pritchard Co.

At Buffalo, a 2,900-bbl.-daily sulfuric acid alkylation unit will be completed September 1957, by M. W. Kellogg Co. A 9,000-bbl.-daily, $2,500,000 catalytic reformer is planned.

Southland Co. has bought site at Black Point, Fla., for an $8,000,000, 15,000-bbl.-daily plant.

Standard Oil Co. of California will up crude capacity 12,000 bbl. daily and vacuum capacity to charge topped crude 20,000

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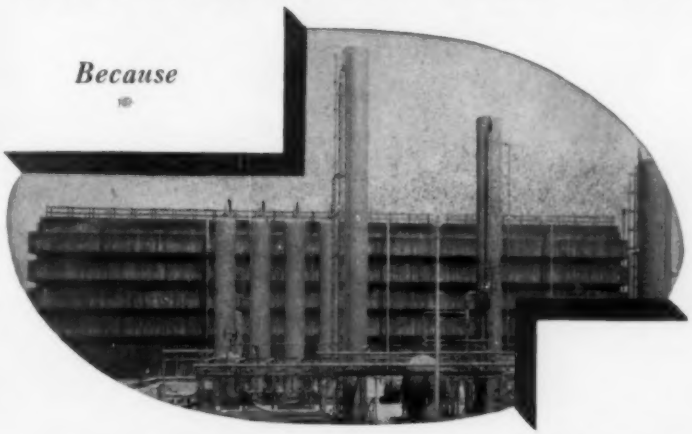

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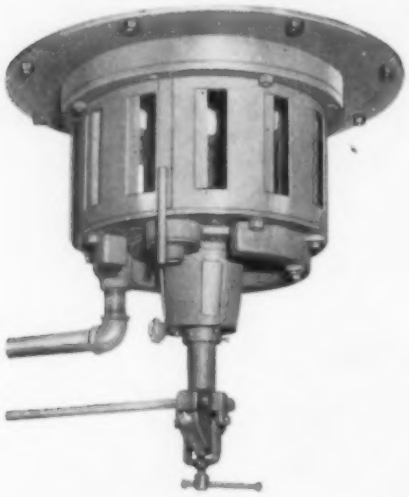

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bbl. per day at El Segundo, Calif., by end of 1957. Fluor Corp. has vacuum unit.

At Everett, Wash., a $75,000,000, 60,000 to 100,000-bbl. per day plant will be built.

At Richmond, Calif., crude capacity will be upped 38,000 bbl. per day by late 1957. By mid-1958, a 20,000-bbl.-daily catalytic reformer will be completed.

At Bakersfield, Calif., a 3,000-bbl. per day catalytic reformer will be completed mid-1958.

Standard Oil Co. (Ind.) will complete a 6,000-bbl.-daily Ultraformer and a 6,000-bbl.-daily Hydrofiner at Neodesha, Kans., January 1958. Foster Wheeler Corp. has contract.

At Whiting, Ind., Ultraforming capacity will be increased 21,000 bbl. daily and Hydrofining 21,000 bbl. daily by April 1958. Ralph M. Parsons Co. has Ultraformer contract.

Standard Oil Co. (Ohio) will complete a $2,400,000, 3,500-bbl.-daily sulfuric acid alkylation unit at Cleveland May 1, 1958. Arthur G. McKee & Co. has prime contract. Auxiliary facilities will cost $1,000,000.

At Toledo, work is under way to replace present crude, thermal, and polymerization units. Crude capacity will be 60,000 bbl. daily, vacuum unit charging topped crude 23,000 bbl. per day, polymerization 1,650 bbl. per day, and delayed coking 8,000 bbl. per day to produce 350 tons per day of coke. Units being added include a 55,000-bbl.-daily fluid catalytic cracker (45 per cent recycle), a 12,000-bbl.-daily Sinclair-Baker catalytic reformer, and a 22,500-bbl.-daily Kellogg Hydrofiner. M. W. Kellogg Co. will complete the $40,000,000 project April 1958.

Standard Oil Co. of Texas will increase crude capacity 28,000 bbl. per day, vacuum unit charging topped crude 13,200 bbl. per day, add a 13,500-bbl.-daily fluid catalytic cracker and a 2,025-bbl.-daily catalytic polymerization unit at El Paso, Tex., by February 1958. Fluor Corp., Ltd., has the catalytic cracker.

Sunshine State Refineries, Inc., plans a 10,000-bbl.-daily plant at Plant City, Fla.

Suntide Refining Co. will complete a 7,500-bbl.-daily BTX Udex unit at Corpus Christi, Tex., September 1957, and up capacity of vacuum unit charging topped crude 8,500 bbl. per day by October 1957. Refinery Engineering Co. has contract.

T

Texas City Refining Co. will increase Houdriflow capacity 1,000 bbl. per day (no recycle), add a 7,000-bbl.-daily Houdriformer and a 7,000-bbl.-daily Houdry hydrogenation unit at Texas City, Tex., by late 1957. Catalytic Construction Co. has contract for the Houdriformer. Cost will be $2,000,000.

The Texas Co. will increase crude capacity 20,000 bbl. per day at Port Arthur, Tex., by January 1, 1958. Fluor Corp., Ltd., is contractor. Capacity of vacuum unit charging topped crude will be increased 32,000 bbl. per day by January 1, 1958. By April 1, 1958, M. W. Kellogg Co. will complete work to increase fluid catalytic cracking capacity 90,000 bbl. per day (33 per cent recycle).

At Lockport, Ill., both Platformer and Unifiner capacities will be increased 10,000 bbl. per day by October 1, 1957.

At Anacortes, Wash., a new refinery will be completed January 1, 1959. It will include 40,000-bbl.-daily crude capacity, 25,000-bbl.-daily fluid catalytic cracking, 7,000-bbl.-daily Platforming, catalytic polymerization, sulfuric acid alkylation, and Hydrotreating. General construction is by

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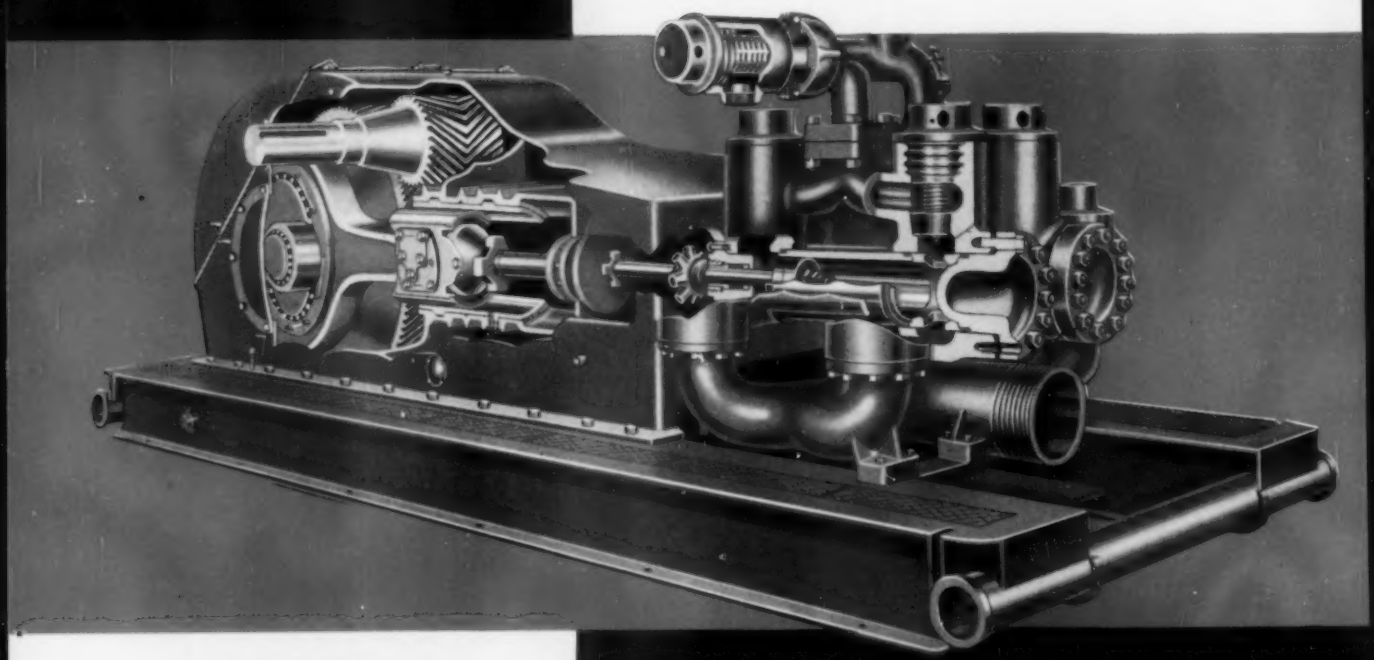

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Tidewater Oil Co. will complete a 22,500-bbl.-daily Houdriformer at Avon, Calif., March 1958. Bechtel Corp. has contract.

W

Wainwright Producers & Refiners, Ltd., will complete a 3,000-bbl.-daily gas-oil cracking unit at Wainwright, Alta., fall 1957. A 600-bbl.-daily Platformer, a Unifiner, and a 50-bbl.-daily catalytic polymerization unit are planned for 1957.

Westland Oil Co. will increase Platforming capacity 600 bbl. per day at Williston, N. D., by September 1957.

Wickett Refining Co. will complete a 1,000-bbl.-daily Catformer and a 1,000-bbl.-daily Unifiner at Wickett, Tex., October 1, 1957.

Field-Processing Plants

. . . construction plans at midyear

A

Ajax Petroleums, Ltd., will complete in 1957, a 20-M.M.c.f.d. plant at Morinville, Alta.

Anchor Gasoline Corp. will complete a 25-M.M.c.f.d. plant at East Krotz Springs, La., October 1957. It will later be expanded to 40 M.M.c.f.d. March Co. of Tulsa is mechanical consultant; processing by Charlie Berry, Tulsa.

Atlantic Refining Co. will complete an absorption-type plant in Crane County, Texas, October 1957. Delta Engineering Corp. has contract.

B

Harry Bass & Sons, Inc., plans an $18,000,000 to $20,000,000 plant in Pembina field, Alberta.

Brazos River Gas Co. plans to expand capacity to 30 M.M.c.f.d. at Mineral Wells, Tex., by March 1958.

British American Oil Co., Ltd., plans to expand capacity 180 M.M.c.f.d. at Pincher Creek, Alta.

C

Cabot Carbon Co. will complete a $1,000,000, 6-M.M.c.f.d. plant in Lea County, near Lovington, N. M., by end of 1957.

E

El Paso Natural Gas Co. will complete a $3,800,000, 165-M.M.c.f.d. plant near Bloomfield, N. M., January 1, 1958. Stearns-Roger Engineering Co. has contract.

G

Ginther, Warren & Ginther plans a plant south of Fort Morgan, Colo. Exact site has not been selected.

Gulf Oil Corp. will expand capacity 60 M.M.c.f.d. at its Waddell plant near Crane, Tex., in 1958, at a cost of $8,000,000. Fluor Corp., Ltd., has contract.

I

Imperial Oil, Ltd., has under way a $750,000, 3-M.M.c.f.d. plant in the Smiley-Coleville area 120 miles southwest of Saskatoon, Sask. Brown & Root, Ltd., has contract.

K

Kansas-Nebraska Gas Co., Inc., will build a million-dollar, 35-M.M.c.f.d. plant at Big Springs field in southwestern Nebraska, to turn out 25,000 gal. of propane, 8,000 gal. of butane, and 6,000 gal. of natural gasoline daily.

Kentucky West Virginia Gas Co. is building a 50-M.M.c.f.d. plant at Maytown, Floyd County, Kentucky. J. H. Jimison & Son, of Huntington, W. Va., has contract. Completion date is indefinite.

L

La Gloria Oil & Gas Co. will complete capacity expansion at Falfurrias, Tex., January 1, 1958. Hudson Engineering Corp. has contract.

O

Ohio Oil Co. will complete a 10-M.M.c.f.d. plant near Orange, Tex., November 1, 1957. O. L. Olsen Construction Co., has contract.

R

Reef Fields Gasoline Corp. will complete a 65-M.M.c.f.d. expansion of capacity at its plant near Big Spring, Tex., by December 1957. Delta Engineering Corp. has contract.

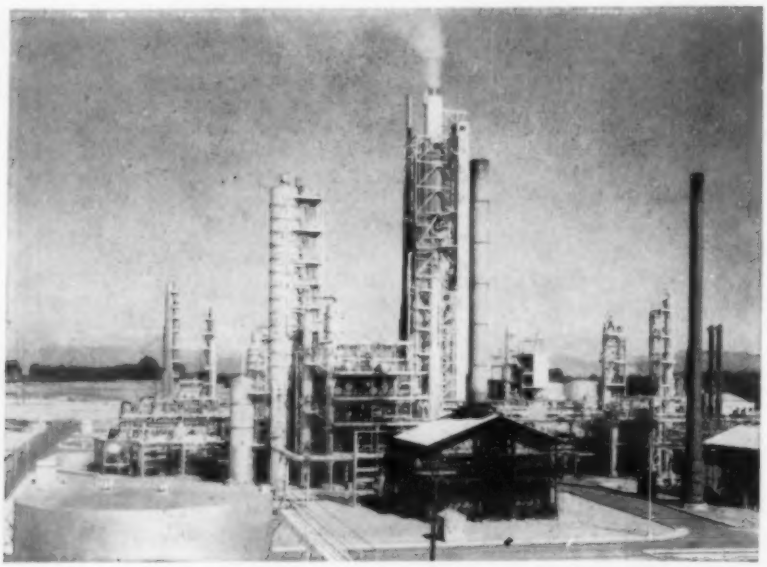
Russell Engineering Corp. will build and operate a 2.5-M.M.c.f.d. plant in Vallery field east of Fort Morgan, Colo.

S

Sinclair Oil & Gas Co. is expanding capacity to 9 M.M.c.f.d. at its Gas Products Plant 27 near Sweetwater, Tex.

At Covington, Okla., a 20,000-gal.-daily deisobutanizer will be completed January 1, 1958.

Sioux Oil Co. is building a $100,000, 4-M.M.c.f.d. plant at Newcastle, Wyo.



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1850-1957

Southern Union Gas Co. will complete a 10-M.M.c.f.d. plant at Dogie Canyon field, near Farmington, N. M., August 1957.

Standard Oil Co. of Texas will complete a $546,000 addition to L.P.G. production facilities at Sherman, Tex., September 1, 1957.

T

Tennessee Gas Transmission Co. will complete a 10-M.M.c.f.d. absorption-type plant near Lovington, N. M., late 1957 or early 1958. It will produce 43,000 gal. per day of propane, butanes, and natural gasoline.

U

Union Oil & Gas Corp. and **Texas Gas Exploration Corp.** will complete September 1957, a 300-M.M.c.f.d. plant at Eunice, La., Fluor Corp., Ltd., has contract.

W

Warren Petroleum Corp. plans a 100-M.M.c.f.d. plant in Oklahoma Panhandle.

Westcoast Transmission Co., Ltd., will complete a 300-M.M.c.f.d. plant at Taylor Flats, B. C., November 1, 1957. It will be operated by Pacific Petroleums, Ltd. Stearns-Roger Engineering Co., Ltd., and Marwell Construction Co. are contractors.

Petrochemical Plant Construction

A

Allied Chemical & Dye Corp. (Semet-Solvay Div.) will increase capacity for producing polyethylene resin pipe compound at Buffalo by end of 1957.

American Cyanamid Co. will double capacity for acetylene, hydrocyanic acid, and acrylonitrile at Avondale, La., by mid-1958. Facilities for new acrylonitrile derivatives are planned.

In Santa Rosa County, Florida, across Escambia Bay from Pensacola, acrylic fiber facilities will be completed mid-1958.

American Oil Co. will complete a 50-ton-daily sulfur-recovery plant plus gas-treating facilities at Yorktown, Va., November 1957. Fluor Corp., Ltd., has contract.

Amoco Chemicals Corp. will complete a 60,000,000-lb. yearly plant at Whiting, Ind., in 1958. It will include manufacture of phthalic anhydride, isophthalic acid, terephthalic acid, dimethyl terephthalate, dimethyl isophthalic, and benzoic acid. Cost is $10,000,000.

At Joliet, Ill., a 60,000,000-lb. aromatic oxidation plant is planned. It will produce phthalic anhydride, isophthalic acid, terephthalic acid, dimethyl terephthalate, dimethyl isophthalate, and benzoic acid.

Ammonia Chemical Corp. of California and **Monterey Oil Co.** will complete a $5,000,000 anhydrous ammonia plant using 5 M.M.c.f.d. natural gas as feed at Huron, Calif., February 1958.

Aniln Co. of N. J. will complete a 33-ton-daily sulfur-recovery plant at Perth Amboy, N. J., by end of 1957. Gencon, Inc., has contract.

Apache Powder Co. will complete a $1,000,000 ammonia synthetic plant at Curtis, Ariz., by late 1957. Girdler Co. has contract.

B

Brea Chemical Co. and **Koppers Co.** will build a 60,000,000-lb. per year polyethylene plant (low-pressure process) at Wilmington, Calif., at a cost of $20,000,000. Koppers will build units; Brea will operate plant. Construction probably will start in 1958.

C

Calcasieu Chemical Corp. (Cities Service, Continental Oil Co., Mineral Industries, Inc., Sears, Roebuck & Co.) will complete facilities to produce 8,000,000 gal. per year of ethylene oxide and ethylene glycol at Lake Charles, La., February 1958. Lummus Co. has contract. Cost is $10,000,000. Petroleum Chemicals, Inc., will operate plant.

Canadian Gulf Oil Corp. is building a sulfur-recovery plant in Pincher Creek gas field, Alberta.

Canadian Hydrocarbons, Ltd., is considering a $25,000,000 plant at Winnipeg, Man., to produce 80 tons per day of ammonia and 600 tons per day of high-analysis nitrogen fertilizers.

Canadian Industries, Ltd., is building a 200-ton per day ammonia plant at Millhaven, Ont.

At Edmonton, Alta., expansion of polyethylene is being considered.

Canadian Oil Refineries, Ltd., will complete last quarter 1957, aromatics facilities (benzene, toluene, and xylenes) at Corunna, Ont. A 4,400-bbl.-daily Platformer and a 3,650-bbl.-daily Udex unit being built will cost $3,000,000.

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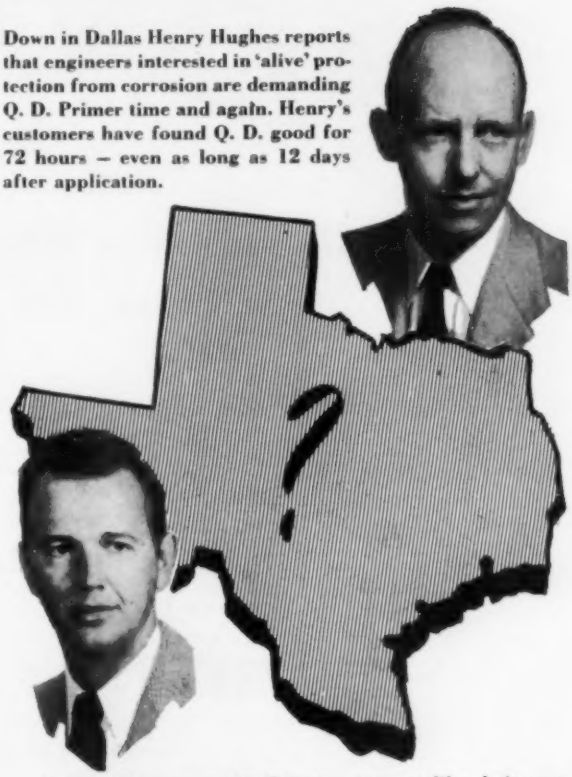

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Carbide Chemicals Co. will double polyethylene and ethylene glycol capacities at Montreal East, Que.

Celanese Corp. of America will complete a 15,000,000-lb. per year acrylic acid esters unit at Pampa, Tex., last quarter of 1957.

At Bishop, Tex., a 25 per cent expansion in methanol, formaldehyde, and acetaldehyde will be complete in 1957.

Chemstrand Corp. will expand its acrylic fiber plant at Decatur, Ala., 15,000,000 lb. per year by mid-1958.

At Pensacola, Fla., capacity of the nylon plant will be expanded to 114,000,000 lb. per year by mid-1958.

Columbia Gas Systems, Inc., and **Commercial Solvents Corp.** are building a $40,000,000 to $50,000,000 ethylene project in the Ohio Valley.

Commercial Solvents Corp. will complete an $8,000,000 expansion of methanol and derivatives at Sterlington, La., fall 1957.

Consolidated Chemical Industries, Inc., is building a sulfur plant at Baytown, Tex. Ralph M. Parsons Co. has contract.

Copolymer Rubber & Chemical Corp. will complete a $3,000,000 steam power plant at Baton Rouge end 1958.

D

Davison Chemical Co. will complete a polyolefin catalyst plant at Cincinnati by end of 1957.

Diamond Alkali Co. will build a $10,000,000, 40-ton-daily acetylene plant at Deer Park, Houston, starting fall 1957. A 50,000,000-lb. per year vinyl chloride monomer unit will be completed early 1958.

Dow Chemical Co. is building an integrated plant to include ethylene oxide-glycol carbon tetrachloride, ethylene dichloride, trichlorethylene, and vinyl chloride at Plaquemines, La., at a cost of $50,000,000.

At Freeport, Tex., ethylene oxide and glycol and triethylene glycol capacities will be expanded by March 1958.

At Velasco, Tex., glycerin capacity is to be expanded.

At Lee Hall, Va., facilities for a new synthetic fiber will be completed spring 1958, at a cost of $15,000,000.

At Bay City, Mich., an ethylene plant will be completed in 1958.

Dow Chemical Co. of Canada, Ltd., has under way projects totaling $7,000,000 and including ethylene glycol, chlorine, ethylene, styrene, and ammonia expansions at Sarnia, Ont.

E. I. du Pont de Nemours & Co. is increasing high-pressure polyethylene at Orange, Tex., and considering upping methanol capacity 30,000,000 gal. per year.

At Belle, W. Va., feed for ammonia synthesis is being converted from coal to natural gas, and methyl methacrylate capacity will be doubled by mid-1958.

At La Place, La., a new plant is planned.

At Ecorse, Mich., a sulfuric acid plant will be completed early 1958.

E

Escambia Chemical Corp. will complete a 16,000,000-gal. per year plant at Pensacola, Fla., first quarter 1958.

Esso Standard Oil Co. is building a $12,000,000 ethylene-recovery unit (part of a $40,000,000 refinery expansion) at Baton Rouge, La.

At Linden, N. J., a plant to include ethylene recovery and manufacture by pyrolysis will be completed early 1958.

Ethyl Corp. will complete a TEL plant at Pittsburg, Calif., mid-year. C. F. Braun & Co. has contract.

At Lake Charles, La., synthetic-rubber facilities are being expanded 50,000 long tons per year.

At Akron, synthetic-rubber facilities are being expanded 10,000 long tons per year.

At Baton Rouge, Catalytic Construction Co. will complete vinyl chloride facilities late 1957.

F

Food Machinery & Chemical Corp. will double capacity of carbon tetrachloride at South Charleston, W. Va., by early 1958. Fluor Corp. is contractor.

Frontier Refining Division of Ashland Oil & Refining Co. will complete a 21,000,000-gal. per year aromatic plant (benzene, toluene, xylenes) at Buffalo, late 1957.

G

General Aniline & Film Co. is building an $8,000,000 plant to produce 60,000,000 lb. per year of ethylene oxide by direct-oxidation process, and 35,000,000 lb. per year of ethylene glycol at Linden, N. J. Scientific Design Co., Inc., has contract.

General Petroleum Corp. will complete a $12,000,000, 10,000-ton per year synthetic ammonia project at Lake Charles, La., late 1957.

Goodrich-Gulf Chemicals, Inc., is expanding GR-S synthetic-rubber capacity at Port Neches, Tex., by phases.

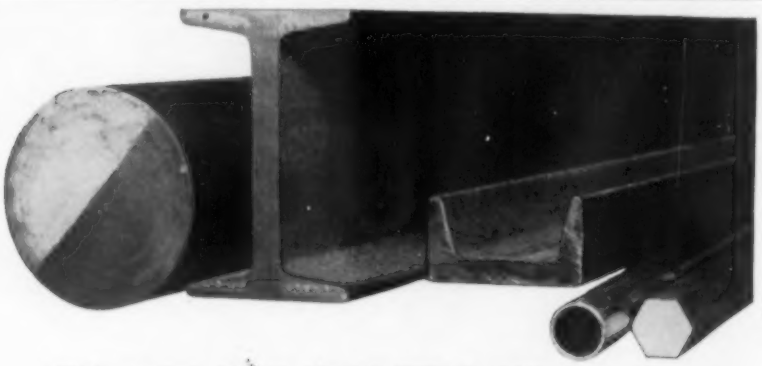
At Orange, Tex., a polyethylene plant is being built by Ralph M. Parsons Co.

At Institute, W. Va., a 4-year expansion and modernization program of synthetic-rubber facilities is planned.

Gulf Oil Corp. is considering a third 20,000,000-lb. per year ethylene unit at Port Arthur, Tex. New benzene facilities are planned.

H

Hancock Chemical Co. will increase sulfur-recovery capacity to 150 tons per day at Wilmington, Calif., by October 1957. Ralph M. Parsons Co. has contract.



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BETHLEHEM SUPPLY

Hawthorne Chemical Corp. (Hercules Powder Co. and I.C.I., Ltd.) is building facilities for formaldehyde, pentaerithrytol, and methanol at Louisiana, Mo., at a cost of $6,000,000. An $11,000,000, 35,000,000-lb. per year mono methyl methacrylate and polymer plant will be completed late 1958.

Heyden Newport Chemical Corp. is reportedly building a 25,000,000-lb. per year pentaerithrytol plant at Fords, N. J.

Humble Oil & Refining Co. will complete butyl-rubber expansion of 13,000 long tons per year first quarter 1958.

At Baytown, Tex., a 80,000,000-lb. per year ethylene (low-temperature recovery) unit will be completed by M. W. Kellogg Co. third quarter 1958. Capacity will be doubled later. Ethylene oxide-glycol is being considered. A 30,000,000-gal. per year benzene unit (Udex) will be completed by Badger Manufacturing Co. end 1957.

I

Imperial Oil Co., Ltd., is expanding recovery facilities for ethylene, propylenes, butylenes, butadiene, aromatic distillates and tars, and petroleum polymers at Sarnia, Ont., at a cost of $25,000,000. A unit to make dodecylbenzene for detergents is being built at a cost of $3,800,000. Canadian Bechtel, Ltd., and Fluor Corp. of Canada, Ltd., are contractors. Completion is set for spring 1958.

J

Jefferson Chemical Co. has under way a $38,000,000 expansion program: ethylene capacity will be 180,000,000 lb. per year; ethylene oxide will be 165,000,000 lb. per year with addition of new direct-oxidation units; ethylene glycol will be 126,000,000 lb. per year; ethylene chloride will be added; chlorine facilities will be built; units for propylene oxide-glycol and other propylene derivatives will be built; ethylene oxide specialties and morpholine will be expanded. Plant is at Port Neches, Tex.

Jeffersin Lake Sulphur Co. and **Pacific Petroleums, Ltd.,** will complete a 412-ton-daily sulfur-recovery plant at Taylor Flats, B. C., fall 1957, at a cost of $1,800,000. Ralph M. Parsons Co. has contract.

Jefferson Lake Sulphur Co. will build a 300-ton sulfur-recovery plant on a Mobil Oil of Canada, Ltd., farmout, 19 miles north of Okotoks field near Calgary, Alta.

K

Koppers Co., Inc., will complete an expandable polystyrene bead plant at Kobuta, Pa., early 1958.

Kerr-McGee Oil Industries, Inc., will complete a $1,500,000 Udex unit at Cleveland, Okla., late 1957.

L

Laurentide Chemical & Sulphur Co. is building a 33,000-long-ton per year sulfur-recovery plant at Montreal East, Que.

M

Mississippi Chemical Corp. will expand nitric acid capacity 150 tons per day at Yazoo City, Miss., by March 1958.

Monsanto Chemical Co. will up acrylonitrile capacity to 100,000,000 lb. per year at Texas City, Tex., by end of 1957.

N

National Petro Chemicals Corp. will complete expansion of ethylene 100 tons per day and high-pressure polyethylene to 100,000,000 lb. per year at Tuscola, Ill., end of 1957.

Neches Butane Products Co. (Goodrich-Gulf, Texas-U. S. Chemical) will complete expansion of butadiene capacity 110,000 short tons per year at Port Neches, Tex., fall 1958. Foster Wheeler Corp. has contract.

Northwest Nitro-Chemicals plans a $150,000 expansion of its fertilizer plant at Medicine Hat, Alta.

O

Odessa Styrene Co. (El Paso Natural Gas Products Co. and United Carbon Co.) will complete a $5,000,000 styrene plant at Odessa, Tex., January 1, 1958. Fish Engineering Corp. is building the plant.

Oronite Chemical Co. asked for $1,200,000 Louisiana state tax exemption to expand Oak Point, La., additives plant.

At Richmond, Calif., a benzoic-toluic acid-recovery unit with capacity of several million pounds per year is being completed.

P

Petroleum Chemicals, Inc., will complete a $12,000,000, 100,000-ton per year anhydrous ammonia plant at Lake Charles, La., October 1957. A 200,000,000-lb. per year ethylene plant will be completed January 1958, by Lummus Co. It is designed for expansion to 300,000,000 lb. per year. A $17,000,000, 30,000-ton per year butyl-rubber plant will be completed late 1958 by Foster Wheeler Corp.

Phillips Chemical Co. will complete a $30,000,000, low-pressure 120,000,000-lb. per year polyethylene plant on Houston Ship Channel at Pasadena, Tex., in 1957.

Phillips Petroleum Co. will complete a 290,000,000-lb. per year ethylene unit to use butane cracking at Sweeny, Tex., in 1957. An acetylene plant will be completed last half 1957.

Polymer Corp., Ltd. (Crown owned) plans increased butadiene-styrene rubber production capacity, construction of new specialty latex plant, and increased butadiene production capacity at Sarnia, Ont.

At Red Deer, Alta., a $5,000,000 to $6,000,000, 7,000-ton per year butadiene plant is planned.

Q

Quebec Ammonia Co., Ltd., plans a

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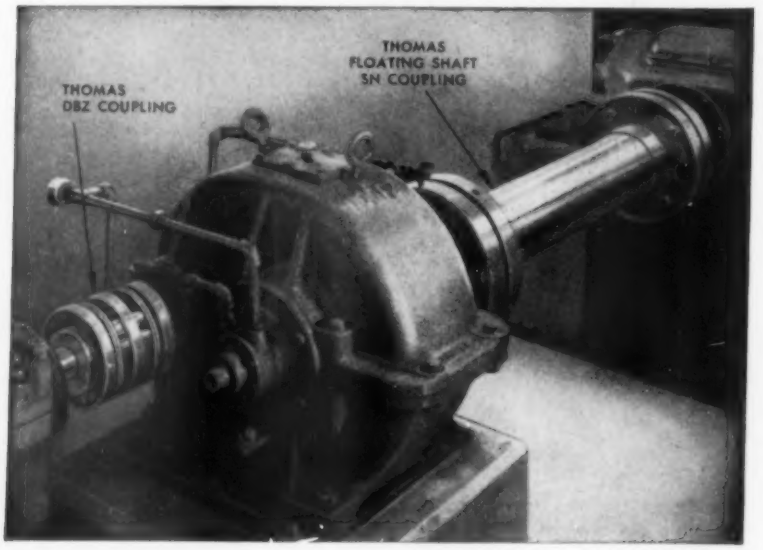

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R

Republic Oil Refining Co. (division of Plymouth Oil Co.) is now engineering a 5,000-bbl. per day Udex unit at Texas City, Tex., to produce benzene, toluene, and xylenes.

Richfield Oil Co. will complete an 18,000,000-gal. per year benzene plant at Watson, Calif., May 1958. Cost is $6,500,000.

Rohm & Haas Co. has contracted for Texaco Development-H.R.I. partial oxidation of natural gas to synthesis gas at Pasadena, Tex. Completion is set for late 1957.

S

St. Paul Ammonia Products Co. is building a $16,000,000 ammonia plant at Pine Bend, Minn., to produce 200 tons per day of anhydrous ammonia and ammonium nitrate solutions.

San Jacinto Chemical Co. (division of Smith-Douglas Co., Inc.) will complete moving its anhydrous ammonia manufacturing and storage facilities from Houston to Texas City, Tex., September 1957.

Shell Chemical Corp. is planning facilities for 30,000,000 lb. per year of glycerin (via acrolein), at Norco, La. Epoxy manufacture may be added later. Hydrogen peroxide facilities will be completed late 1957.

At Houston, Norco, La., and Dominguez, Calif., plants, two-stage expansion is under way to boost isopropyl alcohol 120,000,000 lb. per year. First stage to 70,000,000 lb. per year will be completed in 1957.

Shell Oil Co. of Canada, Ltd., will complete a $1,000,000 EPON resin unit at Montreal East, Que., by end of 1957. Facilities for production of detergent alkylate will be built by early 1958.

Sinclair Chemicals, Inc., is expanding SO_3 sulfonation and lube-oil synthetic detergents additives at Houston.

Spencer Chemical Co. will complete polyethylene expansion to 90,000,000 lb. per year at Orange, Tex., by summer 1958.

At Henderson, Ky., a nylon-6 polymer plant to convert caprolactam to nylon-6 molding resins will be completed fall 1957.

Standard Oil Co. of California will complete a $3,000,000, 25,000,000-lb. xylene plant at Richmond, Calif., early 1958. A $1,750,000 polybutane expansion program is being planned.

Stauffer Chemical Co. is building a 20,000-ton per year titanium tetrachloride plant at Ashtabula, Ohio. Ralph M. Parsons Co. has contract.

At Louisville, Ralph M. Parsons Co. will complete in 1957 a multimillion-dollar plant to produce carbon tetrachloride, chloroform, methylene chloride, and anhydrous ammonia.

Suntide Refining Co. is building a 15,000-bbl. per stream day Rexformer and a 7,500-bbl. per stream day Udex unit at Corpus Christi, Tex. The B.T.X. operation, with capacity of 6,000,000 gal. per year of nitration-grade benzene, 12,000,000 gal. per year of nitration-grade toluene, and over 22,000,000 gal. per year of 10° xylene, will be completed September 1957.

Surpass Petrochemicals, Ltd., is building a $1,000,000, 7,000,000-lb. per year petroleum sulfonates plant near Scarborough, Ont.

T

The Texas Co. will complete a 180-ton-daily ammonia plant at Lockport, Ill., late 1957 or early 1958.

Texas Eastman Co. is expanding high-pressure polyethylene to 40,000,000 lb. per year, increasing Oxo facilities to up butyraldehydes production, and building a semi-commercial linear polyethylene unit (Ind.) at Longview, Tex.

Texas Gulf Sulfur Co., Inc., Shell Oil Co., and **Devon-Palmer Oils, Ltd.,** will build a 300-ton sulfur plant in the Okotoks area, near Montreal, Que.

Texas-U. S. Chemical Co. is expanding GR-S synthetic rubber capacity stepwise at Port Neches, Tex.

U

Union Carbide Chemical Co. will double production of acrylonitrile at Institute, W. Va., in 1958.

At Winfield, W. Va., a $50,000,000, 150,000,000-lb. per year ethylene plant will be built.

Union Oil Co. will complete a 100,000,000-lb. per year ethylene plant at Wilmington, Calif., early 1958. Fluor Corp. has contract.

V

Vickers Petroleum Co., Inc., will complete a $2,000,000 U.O.P. Udex unit to produce 15,000,000 gal. per year of benzene, toluene, xylene, and aromatics at Potwin, Kans., January 1958. Procon, Inc., has contract.

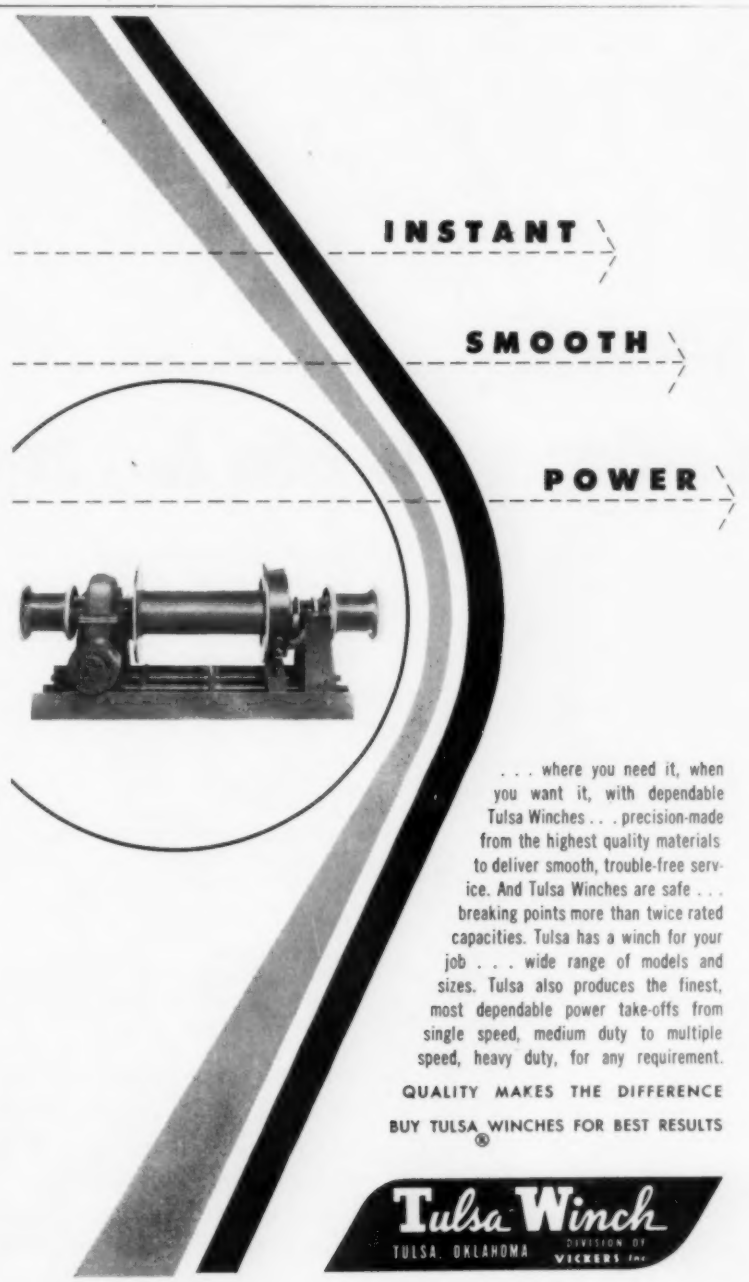
Visking, Ltd., will build a $500,000 polyethylene plant at Fort Gary, Winnipeg, Man.

W

Westvaco Chlor-Alkali Division is expanding its sulfur plant at South Charleston, W. Va. Ralph M. Parsons Co. has contract.

Wilshire Oil Co. is expanding its sulfur plant at Norwalk, Calif. Ralph M. Parsons Co. has contract.

Wyandotte Chemicals Corp. will complete an $8,000,000, 60,000,000-lb. per year ethylene oxide-glycol plant at Geismar, La., fall 1957. Lummus Co. has contract. A $20,000,000 electrolytic chlorine-caustic plant will be completed last half of 1958.



. . . where you need it, when you want it, with dependable Tulsa Winches . . . precision-made from the highest quality materials to deliver smooth, trouble-free service. And Tulsa Winches are safe . . . breaking points more than twice rated capacities. Tulsa has a winch for your job . . . wide range of models and sizes. Tulsa also produces the finest, most dependable power take-offs from single speed, medium duty to multiple speed, heavy duty, for any requirement.

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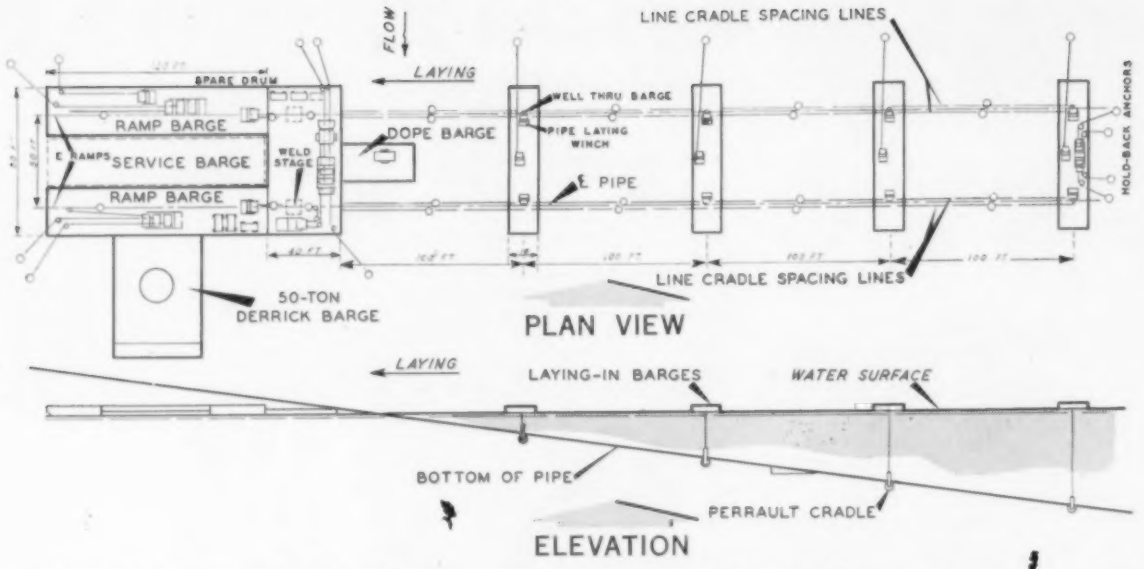
BUY TULSA WINCHES FOR BEST RESULTS ®

Tulsa Winch
TULSA, OKLAHOMA
DIVISION OF VICKERS Inc.



PIPE-LAYING PLANT LAYOUT shows pipe being supported by pontoons between the end of a barge and the river bottom. Fig. 9.

There's a lot of engineering involved in

Getting a Pipeline Across a River

. . . and much of it has to do with the actual construction

By Leo M. Odom

PART 3 OF THREE PARTS

PIPELINE river crossings are usually placed either by pulling the pipe across the river after it has been welded up on shore or by placing it from a laying barge. The laying-barge method is usually slower but is preferred on large rivers particularly where there is considerable current.

Whether the pipe is placed by use of a laying barge or is pulled, it must be supported during installation to prevent excessive longitudinal stresses from developing. A sketch showing a typical pipeline laying barge with pipe being supported by pontoons between the end of the barge and the bottom of the river is shown on Fig. 9.

In order to get a good installation of a pipe across a large river, it is very necessary that the contractor be experienced on river work and that he have adequate and proper equipment. Construction contracts are usually let to the low bidder on a lump-sum basis. The specifications are framed to insure against damage to the pipe during construction and to provide for a good bed and backfill.

The actual details of construction are left to the contractor. This practice permits the owners to take full advantage of the ingenuity of contractors in devising more economical methods of construction.

Author is with Pyburn & Odom, consulting engineers, Baton Rouge, La. Paper presented at A.S.C.E. meeting, Jackson, Miss.

Parts 1 and 2 discussed the types of crossings, characteristics of rivers, and factors involved in river studies and design of a pipeline river crossing. Part 3 covers precautions in construction, inspection, and testing.

Corrosion protection is obtained by doping and wrapping and cathodic protection similar to that provided on land lines. Extreme care is necessary in corrosion control of a crossing because of its future inaccessibility. A careful check of the chemical qualities of the river water at all stages should be made to learn if any special precautions will be necessary.

Selection of Working Season

On all rivers there are certain months in the year when it is feasible to work and others when the best efforts are likely to fail. There are very few rivers for which it can be guaranteed that a trench can be opened up and a pipe can be laid every year. Some years, unpredictable flash floods will occur which will halt dredging, fill trenches, or break the pipe while it is being laid.

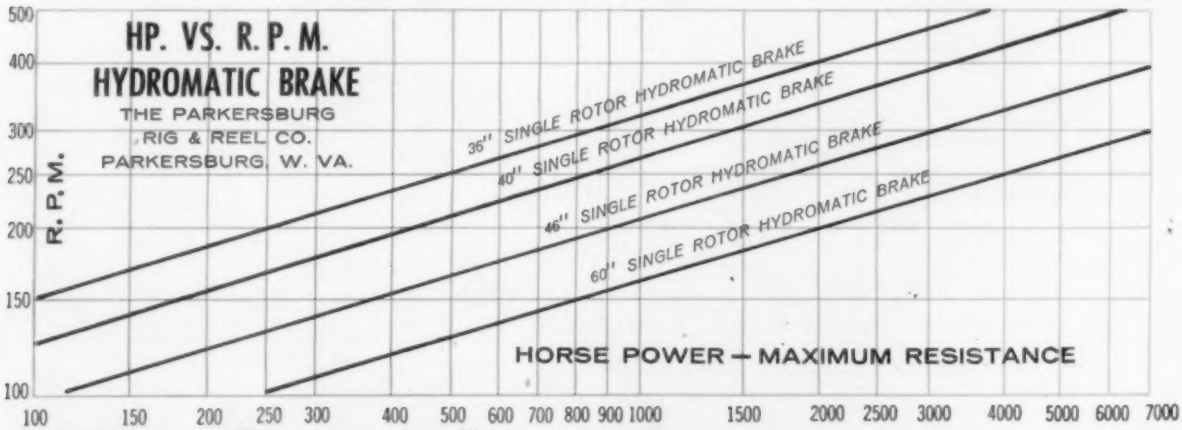
On the other hand, a great deal of misery can be avoided by studying

Parkersburg Hydromatic
BRAKING POWER goes up, up, and up!

Drillers know that the braking power of a Hydromatic increases automatically with the speed of the drum. This means that the load on the drawworks is under complete control at all times.

The Hydromatic has still another advantage . . . it can never fail suddenly and completely. In case of outside reservoir or pump failure, a built-in reserve reservoir in the stator will enable the Hydromatic to keep the load under control until the mechanical brakes can be applied. No other drawworks brake offers this extra protection against runaway loads.

Specify a Parkersburg Hydromatic on your drawworks and make sure you're getting more and safer braking power.



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RIG AND REEL COMPANY
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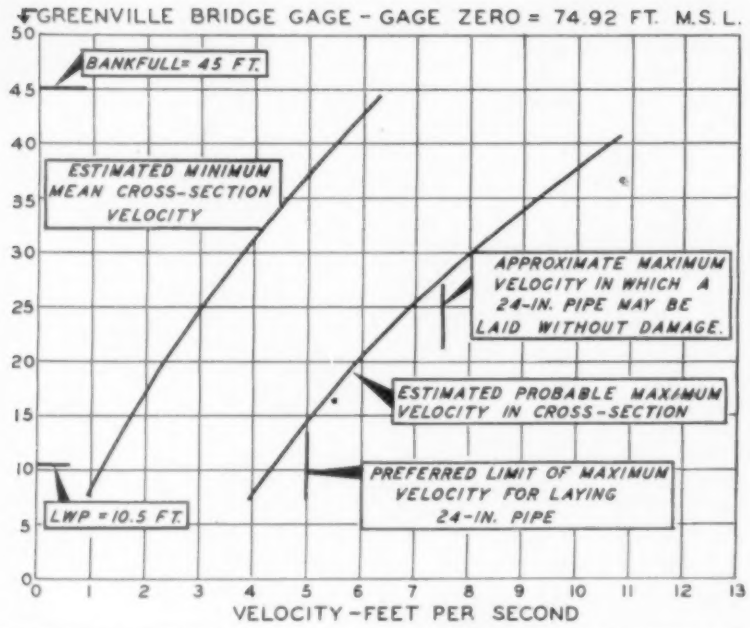

GREENVILLE BRIDGE GAGE - GAGE ZERO = 74.92 FT. M.S.L.
BANKFULL = 45 FT.
ESTIMATED MINIMUM MEAN CROSS-SECTION VELOCITY
APPROXIMATE MAXIMUM VELOCITY IN WHICH A 24-IN. PIPE MAY BE LAID WITHOUT DAMAGE.
ESTIMATED PROBABLE MAXIMUM VELOCITY IN CROSS-SECTION
PREFERRED LIMIT OF MAXIMUM VELOCITY FOR LAYING 24-IN. PIPE
LWP = 10.5 FT.
VELOCITY - FEET PER SECOND

ESTIMATED STAGE-VELOCITY RELATIONS are shown for the Mississippi near Greenville. Curves are based on similar curves (observed) for Chicot landing and Vicksburg discharge ranges, adjusted for slope and cross-section elements. Curves are approximate. No allowance is made for direct effect of contraction at Greenville bridge. Fig. 10.

the hydrographs of the river for a number of years and selecting that period of the year during which the chances of successful work are the best. The critical point in dredging of trenches is reached when the velocity begins to move the bed load of the stream. This point can usually be estimated fairly closely. Velocities in the lower Mississippi River bear a close relation to gage heights. A graph showing the relationship between velocities and gage height near Greenville is shown on Fig. 10.

A graph prepared for a site on the Mississippi River on the basis of recorded gage heights for a number of years is shown on Fig. 11. From these the gage heights is to be expected during the various months of an average year can be computed. A horizontal line is drawn on the chart at the gage height at which the velocity would be sufficient to cause the pipe to flutter during the laying process.

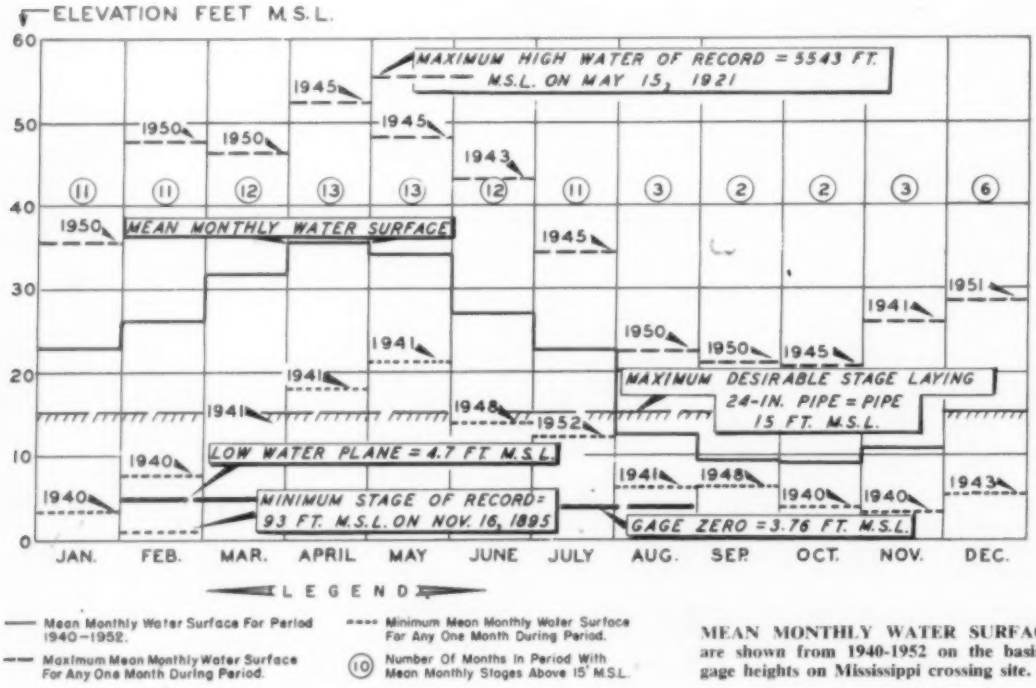
Inspection and Testing

The best-laid plans of engineers are worthless unless they are followed. The only way to insure compliance with specifications is to inspect the work carefully during construction and to test it when it is completed. The construction of a dependable river crossing requires that the welding and corrosion inspection should be of a very high order.

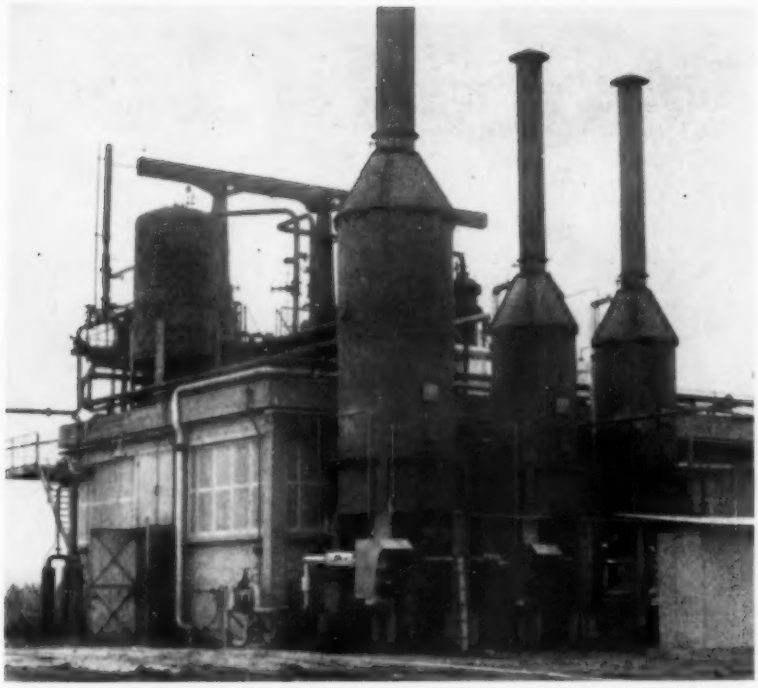
It is also necessary to inspect carefully dredging of the trench to proper grade and alignment. The pipe-laying operation should be checked continually during the progress of the work.

In the surveying and inspection work of construction of trenches and keeping up with the location of the pipe while it is being laid, the author's firm has found the use of an electronic sounding device to be indispensable.

Pressure testing of the underwater line is usually more rigid than for land lines. The usual practice is to test the joints separately at pressures exceeding working pressure before welding them into the line. After the line is laid, it is customary to run a pig through and to give the crossing a test for several hours at about 125 per cent of working pressure before backfilling. The testing is done either with gas, air, or water. **End.**


ELEVATION FEET M.S.L.
MAXIMUM HIGH WATER OF RECORD = 55.43 FT. M.S.L. ON MAY 15, 1921
MEAN MONTHLY WATER SURFACE
MAXIMUM DESIRABLE STAGE LAYING 24-IN. PIPE = PIPE 15 FT. M.S.L.
LOW WATER PLANE = 4.7 FT. M.S.L.
MINIMUM STAGE OF RECORD = 9.3 FT. M.S.L. ON NOV. 16, 1895
GAGE ZERO = 3.76 FT. M.S.L.
JAN. FEB. MAR. APRIL MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.
LEGEND
Mean Monthly Water Surface For Period 1940-1952.
Maximum Mean Monthly Water Surface For Any One Month During Period.
Minimum Mean Monthly Water Surface For Any One Month During Period.
Number Of Months In Period With Mean Monthly Stages Above 15' M.S.L.

MEAN MONTHLY WATER SURFACE elevations are shown from 1940-1952 on the basis of recorded gage heights on Mississippi crossing site. Fig. 11.



HYDROGEN is made from fuel oil in this Establissements Kuhlmann plant, at Paimboeuf, France, by the Texaco partial-oxidation process.

Texaco process proves commercial success as . . .

Hydrogen Is Produced From Fuel Oil in French Plant

Operation maintained at steady, efficient rate

PAIMBOEUF PLANT has been provided with instrumentation for complete operating control and automatic safety control.

THE TEXACO process for production of hydrogen from fuel oil has been proved successful in commercial operation at the Paimboeuf, France, plant of Establissements Kuhlmann.

This successful application proves and amplifies the results of a long pilot-plant study made by The Texas Co. and Hydrocarbon Research, Inc., at Montebello, Calif.

The French plant began operations in September 1956. Design information for the plant was furnished by Texaco, and engineering was carried out by Kuhlmann with the cooperation of the French firm, Societe Technique d'Entreprises Chimiques (S.T.E.C.).

Process Description

Heated fuel oil at high pressure is mixed with a suitable quantity of steam and preheated. The fuel oil-vapor mixture is then admitted into a special burner and mixed with compressed oxygen. The reactants flow into a converter maintained under pressure and at a high temperature.

Under the operating conditions, a controlled oxidation reaction is accomplished. The principal reaction can be expressed by the general formula:

$$C_nH_{2n} + \frac{nO_2}{2} = nCO + nH_2$$

The gases leaving the converter are cooled rapidly.

Formation of carbon . . . The principal reaction is accompanied by the formation of carbon which may be of two different origins:

1. Thermal dissociation of hydrocarbons.
2. Decomposition of carbon monoxide:

$$2\,CO = C + CO_2$$

The formation of carbon corresponding to (1) can be controlled by the choice of operating conditions. The amount corresponding to (2) depends principally upon the manner of cooling the gas.

The separation of carbon from the gas is accomplished in an efficient manner. Its recovery for commercial use will be the object of further study.

It may be mentioned that when the carbon is mixed with water it can be decanted readily into a tank and that the water recovered is perfectly clear.

Features of the Process

Outstanding process features are simplicity, efficiency, adaptability, safety, and economy.

FOR CATALYTIC CRACKING

Houdry Mineral Kaolin, an improved pelleted natural cracking catalyst, gives maximum octane at lowest cost in Houdriflow and TCC Moving Bed Units. Features include high activity, sulphur resistance, superior thermal stability, and excellent regenerability.

FOR CATALYTIC REFORMING

Houdry Type 3-D Platinum is the improved, pelleted platinum catalyst for high efficiency in catalytic reforming operations. It increases octane number and selectivity, offers increased activity and stability at low cost.

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FOR DESULFURIZATION

Houdry Cobalt Molybdate makes available improved performance in desulfurization operations. This commercially proved catalyst offers high hardness and excellent activity and stability at low cost.

FOR DEHYDROGENATION

Houdry Chrome Alumina, developed specifically for use in the Houdry Dehydrogenation Process, features very high selectivities and outstanding stability for the dehydrogenation of light hydrocarbons.

Houdry provides a full line of alumina and silica-alumina base catalysts. In addition, Houdry will assist in developing custom-made catalysts for special requirements. Further information will be sent on request.

Progress through Catalysis

HOUDRY
PROCESS CORPORATION
1528 Walnut Street Philadelphia 2, Pa.

"Starting up, onstream operation, and shutdowns are accomplished easily from a central control station. The ability of the process to operate at various capacities has been demonstrated. Operating stability and the good, uniform quality of the product gas have been obtained over a wide range above and below the nominal design capacity."

Simplicity . . . The extreme simplicity of the production apparatus and its small dimensions deserve attention.

The plant at Paimboeuf has been furnished with an arrangement for very complete operating control and for automatic safety controls. Information from this plant will permit some simplification of the instrumentation.

Efficiency . . . This is evidenced by the very low production of methane and the high thermal yield. Impurities, especially sulfur compounds, are practically all removed by standard refining processes.

The substitution of gas from the Texaco plant for water gas produced from coke has been made without upsetting other facilities used for the manufacture of ammonia.

Adaptability . . . Starting up, onstream operation, and shutdowns are accomplished easily from a central control station. The ability of the process to operate at various capacities has been demonstrated. Operating stability and the good, uniform quality of the product gas have been obtained over a wide range above and below the nominal design capacity.

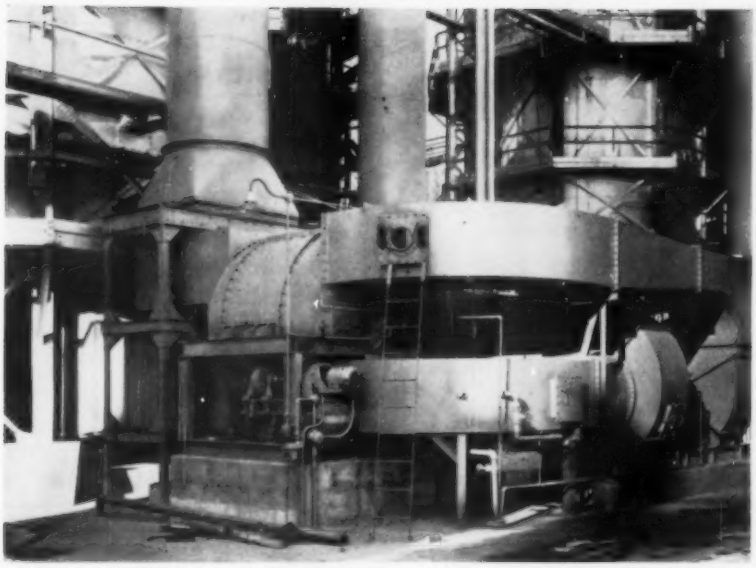
Safety . . . An ingenious arrangement of controls automatically regulates factors essential to safe operation and stops the operation when any dangerous change begins to occur.

During the preliminary operating period there were, of course, numerous stops due to this safety system, but subsequent operations have been maintained at a steady, continuous, and efficient rate.

Economy . . . When using fuel oil, production of the gaseous mixture under pressure is accomplished with a low expenditure of energy for compression. An important saving corresponding to this compression load is therefore realized. Only a part of this saving in energy is consumed in the production of the oxygen needed.

End.

Translation of an article by Omer Gourlet, of Establissements Kuhlmann, for publication in February 1957 issue of L'Industrie Chimique.



TYPICAL Ljungstrom air-heater installation on one of Sinclair's vertical DeFlorez furnaces.

Air heater helps Sinclair boast . . .

Twenty-Five Per Cent Less Fuel Per Barrel of Crude

. . . than the average of U.S. refineries

By O. F. Campbell

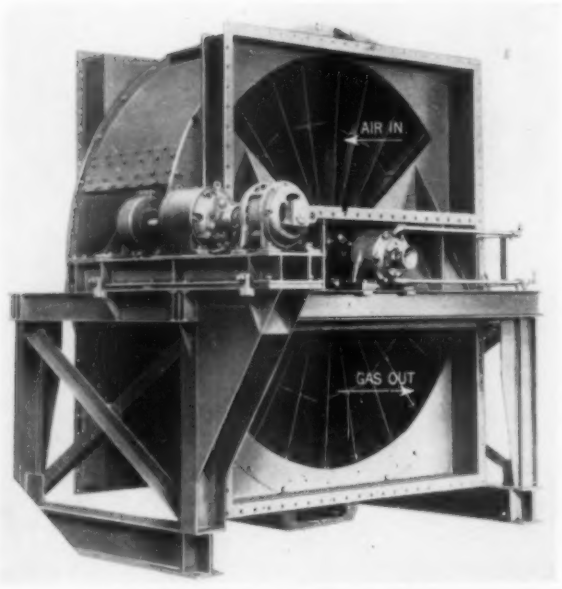
FOR the past 35 years, Sinclair Refining Co. has been striving to keep its fuel cost at a low level. For equivalent refining intensity, Sinclair uses approximately 25 per cent less fuel per barrel of crude than the average of all U. S. refineries. Many different devices have been used to trap, utilize, and conserve waste heat. One of these devices is an air heater which recovers waste heat in the flue gases and returns it to the furnace.

Air Heaters for Stills

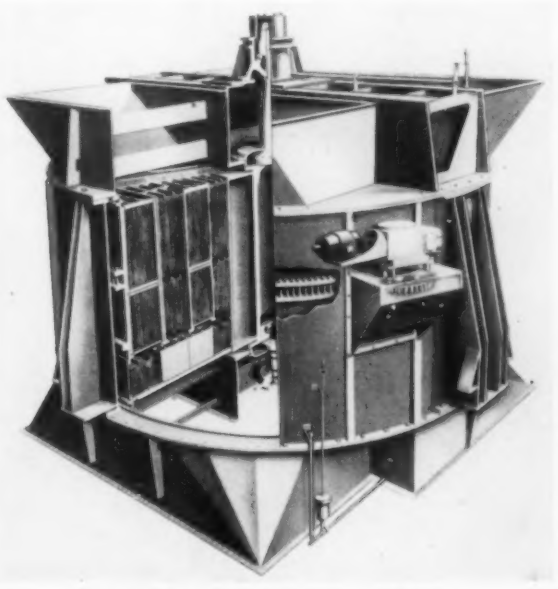
- Sinclair has approximately 100 air heaters in its refineries. About 90 per cent of these air heaters are of the regenerative type. Of these, the majority are of the horizontal regenerative type, designed for an inlet gas temperature of 1,400° F. and normally operated at approximately 1,300° F. or less. The exit flue-gas temperatures leaving the air heaters vary from 325° to 550° F.
- In general, it appears that the oil industry has not accepted air heaters to improve the fuel-burning efficiency of stills.

Built as quickly . . . When in need of an oil-heating furnace, many refiners feel that it must be built quickly and as cheaply as possible. The records, however, show that oil-still furnaces equipped with air heaters are built just as quickly as the entire unit or still is built. It is true that a cheap, inefficient furnace can probably be completed sooner than can a furnace equipped with air heaters. But when

Author is with Sinclair Refining Co., East Chicago, Ind.



HORIZONTAL-TYPE Ljungstrom air heater.



VERTICAL-TYPE Ljungstrom air heater.

The author says . . .

● With ever-increasing fuel prices, refiners are beginning to realize that something must be done to reduce fuel costs. Sinclair's past policy of building oil-still furnaces to operate at or above 75 per cent thermal efficiency based on the gross heating value of the fuel is currently paying off in large measures.

● It is fundamentally wrong to waste fuel when it is possible to conserve it. It is hoped that these few comments will initiate some fuel-conservation planning aimed at reducing refinery fuel consumption.

built, it is invariably the first part of the still completed and then awaits the completion of the rest of the unit. Under these circumstances, there should normally be ample time to build a more efficient furnace. Any consideration of cheap, inefficient furnaces vs. high-efficient furnaces should be guided by the axiom "a cheap furnace is seldom good and a good furnace is seldom cheap."

No extended down time . . . The fear of extended down time due to an air-heater failure is unfounded. The regenerative type of air heater can be repaired or completely replaced in a normal turnaround of a still. When properly instrumented with automatic combustion control, the air heater is no more complicated or difficult to operate than other equipment for the successful operation of a modern still. Sinclair operators accept without question or fear of shutdown of a still equipped with an air heater.

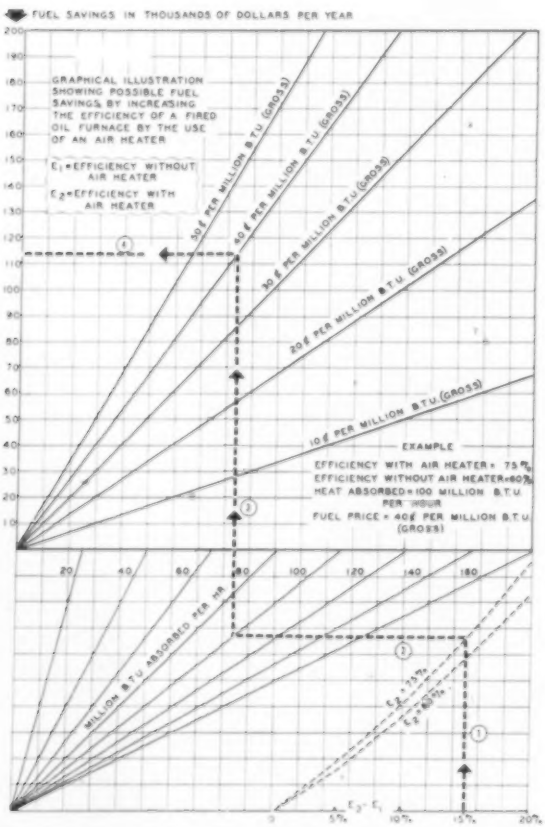
If the furnace is adequately equipped with smothering steam, there is no danger of air-heater failure when a tube rupture occurs. Maintenance of air heaters is a direct function of the sulfur content of the fuel and the exit-gas temperature. When burning natural or low-sulfur fuel gas, the maintenance is extremely low. Sinclair has had some preheaters using natural gas that have had no maintenance in 10 years.

For high-sulfur fuels (above 3 per cent) the low-temperature elements and seals may have to be replaced in 3 years. As a general rule, it can be stated that maintenance will cost approximately 5 per cent per year of the first cost of the air heater.

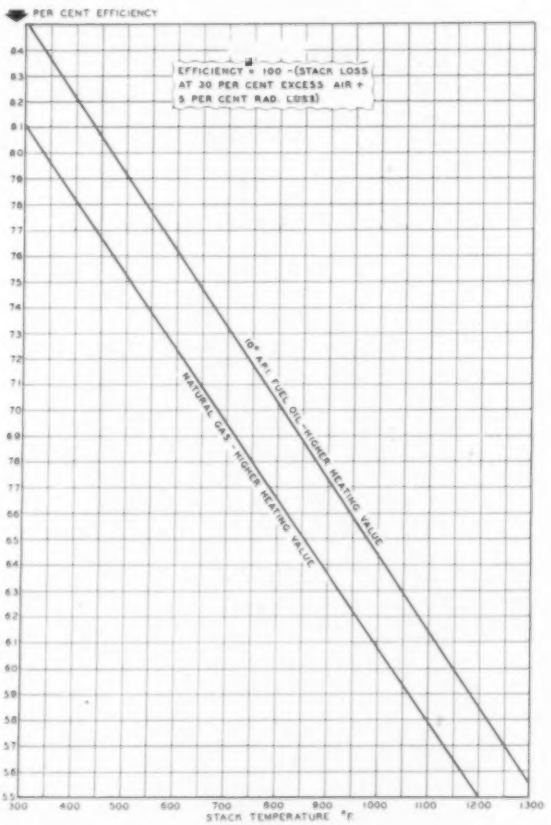
When air heaters are used, it is normally necessary to install forced and induced-draft fans. These fans require power, and the average power requirement will be approximately 1 hp. per million B.t.u. liberated.

When Is Air Heater Justified?

The economy of using air heaters is a wide variable and depends primarily upon fuel price. The higher the fuel price, the greater the justification for an air heater. During the past decade, fuel prices have shown a steady increase and, consequently, air heaters are looked upon with somewhat greater favor. To arrive at the gross fuel savings, it is only necessary to determine the excess air and exit-stack temperature without the air heater, and compare this efficiency figure with the efficiency that will be obtained with an air heater. When fuel prices are


FUEL SAVINGS IN THOUSANDS OF DOLLARS PER YEAR
GRAPHICAL ILLUSTRATION SHOWING POSSIBLE FUEL SAVINGS BY INCREASING THE EFFICIENCY OF A FIRED OIL FURNACE BY THE USE OF AN AIR HEATER
E1 = EFFICIENCY WITHOUT AIR HEATER
E2 = EFFICIENCY WITH AIR HEATER
30¢ PER MILLION B.T.U. (GROSS)
40¢ PER MILLION B.T.U. (GROSS)
50¢ PER MILLION B.T.U. (GROSS)
20¢ PER MILLION B.T.U. (GROSS)
10¢ PER MILLION B.T.U. (GROSS)
EXAMPLE
EFFICIENCY WITH AIR HEATER = 75%
EFFICIENCY WITHOUT AIR HEATER = 60%
HEAT ABSORBED = 100 MILLION B.T.U. PER HOUR
FUEL PRICE = 40¢ PER MILLION B.T.U. (GROSS)
MILLION B.T.U. ABSORBED PER HR.
E2 = 75%
E1 = 60%
E2 - E1

FUEL SAVINGS per year at various furnace efficiencies with and without air heaters over a range of heat absorption per hour with various fuel prices per million B.t.u. Fig. 1.


PER CENT EFFICIENCY
EFFICIENCY = 100 - (STACK LOSS AT 30 PER CENT EXCESS AIR + 5 PER CENT RAD. LOSS)
10° API FUEL OIL - HIGHER HEATING VALUE
NATURAL GAS - HIGHER HEATING VALUE
STACK TEMPERATURE °F.

EFFICIENCY at 30 per cent excess air for different exit flue-gas temperatures for natural gas and 10° A.P.I. fuel oil. Fig. 2.

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HEAVY DUTY Self-Aligning SAND SEALED-OFF PUMPS

Lower your lifting cost by using Thompson Sand Seal Self-Aligning Metal-to-Metal Pumps, or with our Combination Plunger and Cup Pumps. Equipped with Regular or Extra Long Alloy Plungers, ground individually to fit the barrels, assuring longer life on both pump and surface equipment.

SELF-ALIGNING SAND SEALED-OFF PUMPS Fig. 600-800

Inverted Combination Single or Double Plunger Self-Aligning Pumps can be equipped with a Sand Flush Valve which seals the Plunger off on top and cleans the barrel every pump stroke.

Sand is deposited into blind cage above the plunger and is discharged every stroke of the pump. The bottom of plunger is sealed to eliminate slippage. Easy on surface equipment. Lower lifting cost with Sealed-Off Pumps.

COMBINATION ROD GUIDE AND PARAFFINE SCRAPER

This exclusive Thompson device eliminates wear on rods and pump. Insures proper alignment and removal of paraffine ahead of pump. Allows pump to pull freely. Standard equipment with many operators.

SPECIAL HEAVY DUTY SEATING DEVICE

This special Combination Sand Housing and Seating Device is invaluable in bad sand conditions, especially where pump is sanding into the tubing. In extremely sandy wells the pump may be unseated occasionally to allow a small portion of tubing fluid to flush through the sand housing and return the accumulated sand to the well.

Pumps for all fields, depths and conditions. For further information write for complete catalog.

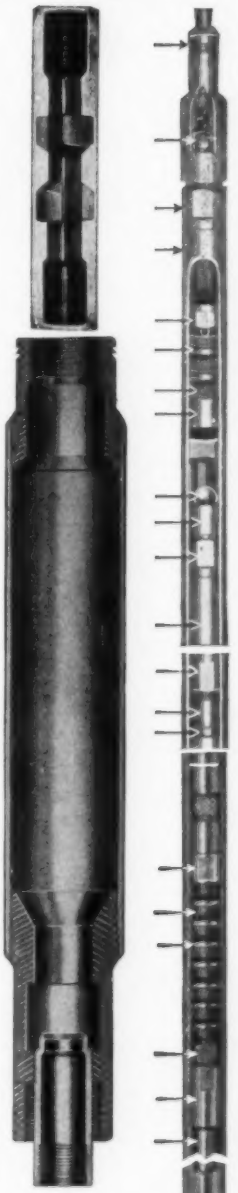

Fig. 700A Heavy Duty Seating Device

Fig. 600-800-900

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Eureka, Kansas
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Heidelberg, Miss.
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Seminole, Okla.
Shidler, Okla.
Stephens, Ark.
Vivian, La.

Versatile Emergency Jack Lifts 15 Tons at 4 Lifting Points

Lifting, skidding and leveling rigs; pushing, pulling and positioning machinery; supporting pipe and equipment are just a few of the oil field jobs done easily with the versatile Simplex No. 310A Emergency Jack. It handles full 15-ton capacity at four points; has 13" lift with minimum toe height of 2¼"; tilts on base for use at any angle.

Unique "Center-Hole" Hydraulic Units Pull . . . Lift . . . or Push in Any Direction

Pulling or installing cylinder liners, valve seats, pinions, bushings, wrist pins, keys, wheels, gears, etc. is fast and easy with a Simplex "Center Hole" Hydraulic Unit. Also serves as heavy-duty jack or hydraulic press. Remote-controlled and self-contained models in 10 to 100 tons capacity. "Center-Hole" tubular construction simplifies rigging, eliminates torque, makes pulling easier.

OTHER SIMPLEX OIL FIELD JACKS . . . include Lever, Screw and Standard Hydraulic types in a **complete** range of sizes and capacities.

WRITE FOR GENERAL CATALOG

Miniature Jack for 50c!

This 3" high Simplex Screw Jack will lift 500 pounds two inches. Has all operating and construction features of larger screw jacks. Also is ideal desk ornament, paper weight. 50c ea. Shipped prepaid. Send cash or check to:

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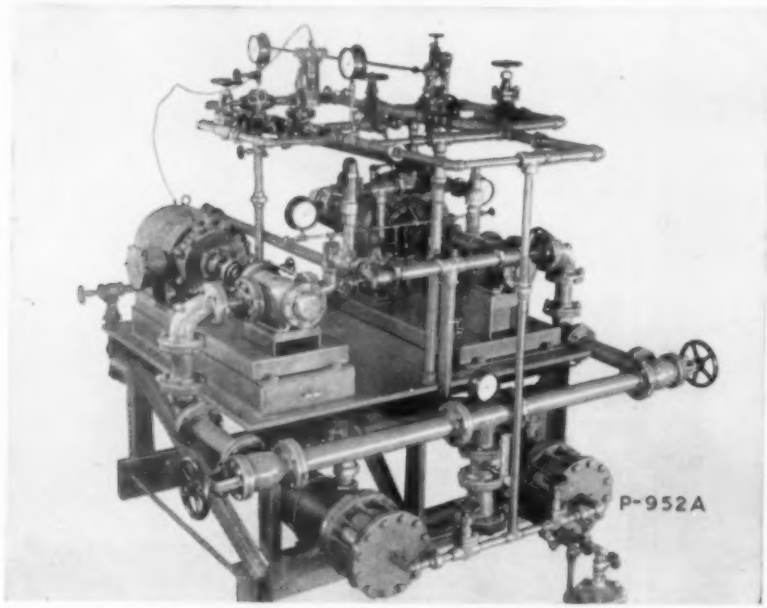
A. C. Templeton, 5627 Del Roy Drive, Dallas, Texas

COMPLETE RANGE OF SIZES AND MODELS IN BOTH MEDIUM AND HIGH PRESSURE TYPES

MORE COMPACT THAN EVER . .



P-952A—Steam Turbine and Electric Motor drive gives flexibility in this compact Model P-ES2H size No. 25 unit.

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FUEL OIL PUMPING *AND* HEATING UNITS

NATIONAL AIROIL Fuel Oil Pumping and Heating Units are specially designed to prepare, for combustion, all grades of fuel oil including No. 6 or Bunker "C" Oil and residuums. They will draw fuel oil from above ground or underground tanks, preheat it to proper constant temperature and deliver it to Oil Burners at an even pressure, best suited for the burners. Our Fuel Oil Pumping and Heating Units are the result of years of experience. They come completely equipped ready for steam, exhaust, condensate, oil suction, oil return and electrical connections. All valves, regulators, etc., are readily accessible. The piping arrangement is easily understood. These compact, space-saving units are available in a range of sizes and models in both Medium and High Pressure types. For complete details, write for our Bulletin 40—very interesting and informative.

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STEAM ATOMIZING OIL BURNERS
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DUAL STAGE, Combining Steam and Mechanical Atomization
LOW AIR PRESSURE OIL BURNERS
AUTOMATIC OIL BURNERS, for small process furnaces and heating plants
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known, the fuel savings can then be easily calculated. For a better understanding of potential savings, Figs. 1 and 2 have been prepared.

Payout . . . Main purpose of the air heater is to lower the exit flue gas temperature. Fig. 2 shows efficiency at 30 per cent excess air for different exit flue gas temperatures for natural gas and 10° A.P.I. fuel oil. Fig. 1 shows the fuel savings per year at various furnace efficiencies with and without air heaters over a range of heat absorption per hour with various fuel prices per million gross B.t.u. From the potential fuel saving, there must be deducted the cost of maintenance and power. The net savings will indicate what can be paid for an air heater installed to obtain a payout. Sinclair's experience shows that air heaters pay out in less than 3 years.

Better heater performance . . . In addition to fuel prices, preheated air aids combustion, improves radiant-heat transfer, and smooths out heater performance for sudden changes in atmospheric conditions. In some instances where oil inlet temperatures are high, convection sections may be eliminated and the air heater serves as the only heat trap. Caution, however, must be exercised to be certain that the temperature of the flue gases entering the air heater do not exceed the design temperature of the air heater.

Air Heaters and Economizers

This discussion does not intend to imply that air heaters are the only good heat trap to conserve heat. Economizers that produce steam or heat up other colder oil streams may prove more economical. The smaller the air heater, the smaller are the net savings; hence it is generally not economical to install air heaters with heat absorptions less than 30 million B.t.u. per hour. For refining units that require several small heat-absorption furnaces such as small catalytic reformers, it is obvious that air heaters would not be economical on each furnace, although a common air heater for all furnaces may prove to be economical. For small catalytic reformers, it appears that steam-producing forced circulation economizers are more economical. Steam-producing economizers can be installed either on individual furnaces or as a common economizer. Except for these isolated cases, however, this discussion points up the fact that air heaters definitely have their place and are the best tool for conserving heat, particularly for many of the larger oil-still furnaces.

For Tidelands Oil . . .

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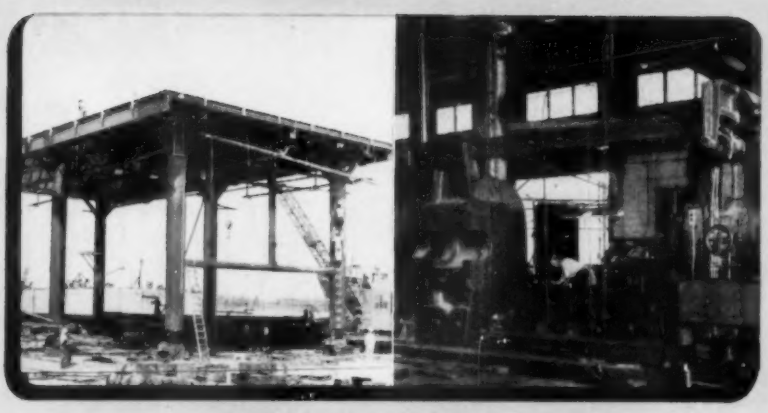

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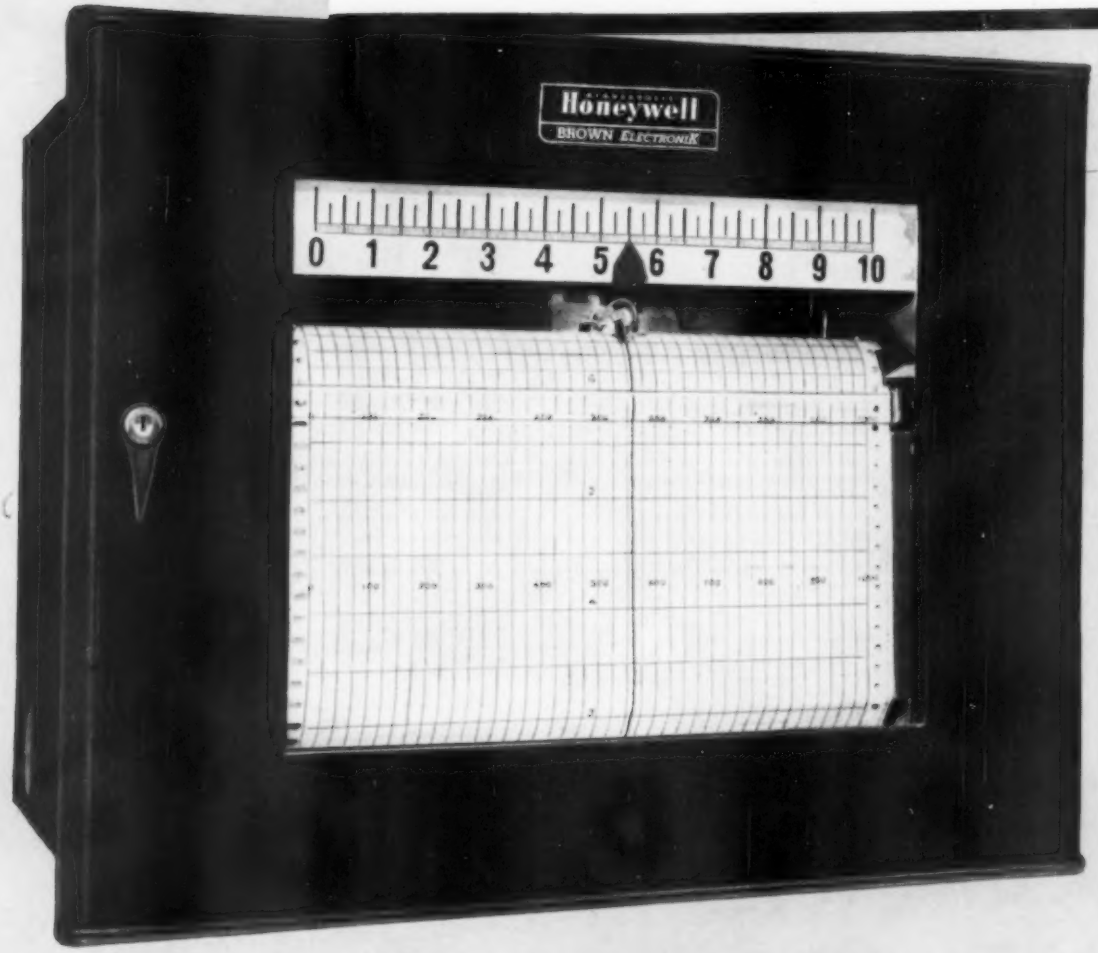

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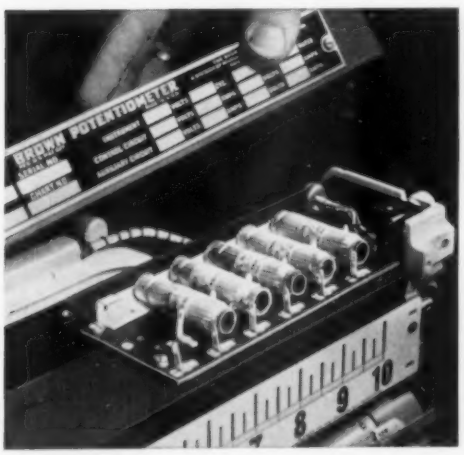

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Among the Drilling Contractors

Kozak Directs Expansion Of Garvey Contact Work

In another move by Garvey Drilling Co. to expand its contract drilling activities, Frank G. Kozak, previously Rocky Mountain contact representative, working out of Denver, now is

BILL GARMS

FRANK KOZAK

headquartering at the company's central field office at Great Bend, Kans., where he has been elevated to the newly created position of contact manager.

Filling his former Denver position is Bill Garms, a recent addition to the company's contact representatives. Garms came to the Garvey organization from ACC Diamond Coring, Denver. Prior to that connection, he was with Christiansen Diamond Products Co., Salt Lake City.

Kozak, in his new position, assumes responsibility for the direction and development of Garvey's contact program.

In addition to Garms at the Denver office, those working with Kozak in the company's contact program include James H. Gardner, Jr., representative at Wichita, and Neal Colby, at Oklahoma City.

Over-all operations of the company are under the direction of Claude W. Bard, general manager, headquartering at Great Bend.

Smackover Drilling Co., Inc., El Dorado, Ark., has contracted for a wildcat test in Crittenden County, in northeastern Arkansas. Operator is Ralph A. Johnson, of Houston, who plans a 3,500-ft. Paleozoic test. Location is about 16 miles northwest of Memphis in the Marion area. Spot is in 23-8n-7e.

Carl Vickers has been given another location to drill on North Central Oil Corp.'s Kenedy Ranch block west of the Panascal gas area, 20 to 25 miles southeast of Sarita, in northeastern Kenedy County, lower Texas Gulf Coast. It will be his fourth job for North Central on that block this year, and will be started as soon as the rig, now drilling on the third test, is available. Location is 2½ miles southeast of the current job, scheduled to go to 7,500 ft. The first two tests were dry holes at 8,461 ft. and 7,003 ft., respectively.

Kern Drilling Co., Magnolia, Ark., has scheduled a 4,100-ft. test to be drilled for Placid Oil Co., of Shreveport, at a wildcat location 3½ miles southwest of Garland City, in Miller County, southwestern Arkansas. It will be Placid's 1 Dodson, in 25-16s-26w.

Novak Drilling Co., Tulsa, is drilling for Cameron Oil Co. at a rank wildcat location 10 miles north of Rifle, in Garfield County, western Colorado. Location is at 1 Bowen, in 20-4s-93w.

Carmack Drilling Co., Denver, is getting under way on a Malco Refineries' contract in eastern Moffat County, northwestern Colorado. It is a wildcat operation at 1 Montery-State, in 36-6n-90w, about 7 miles southeast of Craig.

Brown Drilling, Ltd., Edmonton, Alta., is drilling for Canadian Chieftain Petroleums on a new location in the South Joffre area, near Red Deer, in Alberta Province, Canada. It is to be a Mississippian test with objective about 6,000 ft., well below the Viking (Cretaceous) sand now productive in the field. The test, 15-5 South Joffre, is about a half mile southeast of production.

H. R. Smith Drilling Co., Alice, Tex., has a new 5,500-ft. operation in Live Oak County, South Texas. Drilling is for Skinner Corp. with Smith holding an operating interest. Location, at 1 Cox, in the P. Salinas Survey, is about 3 miles northwest of Dinero, in the southeastern part of the county.

E. J. Pearl, Alice, Tex., is contractor and joint operator with C. R. Butler and C. C. Winn in the drilling of a 5,100-ft. test northwest of North Santa Cruz field, 12 miles southeast of Benavides, in southeastern Duval County, South-

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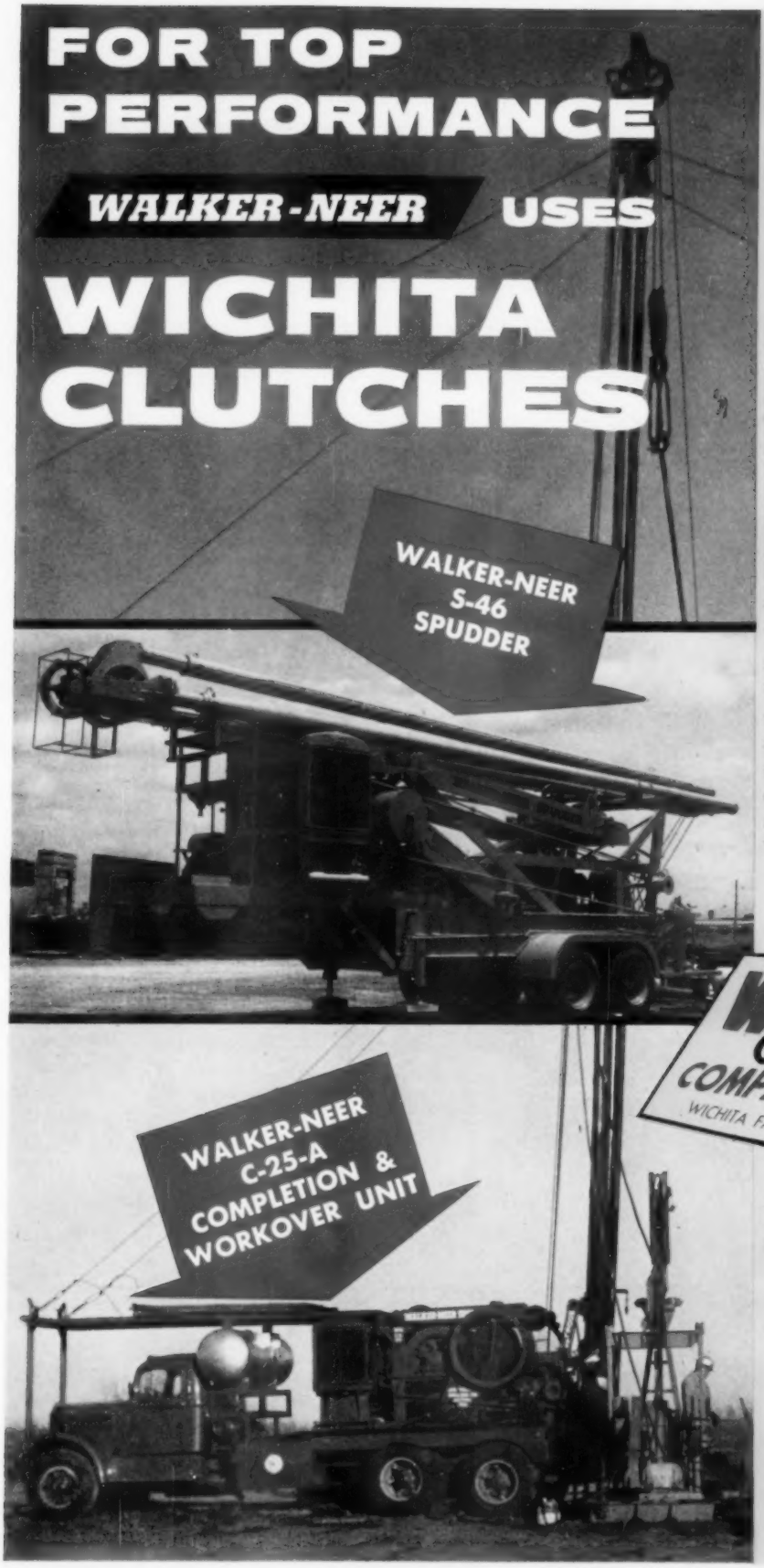

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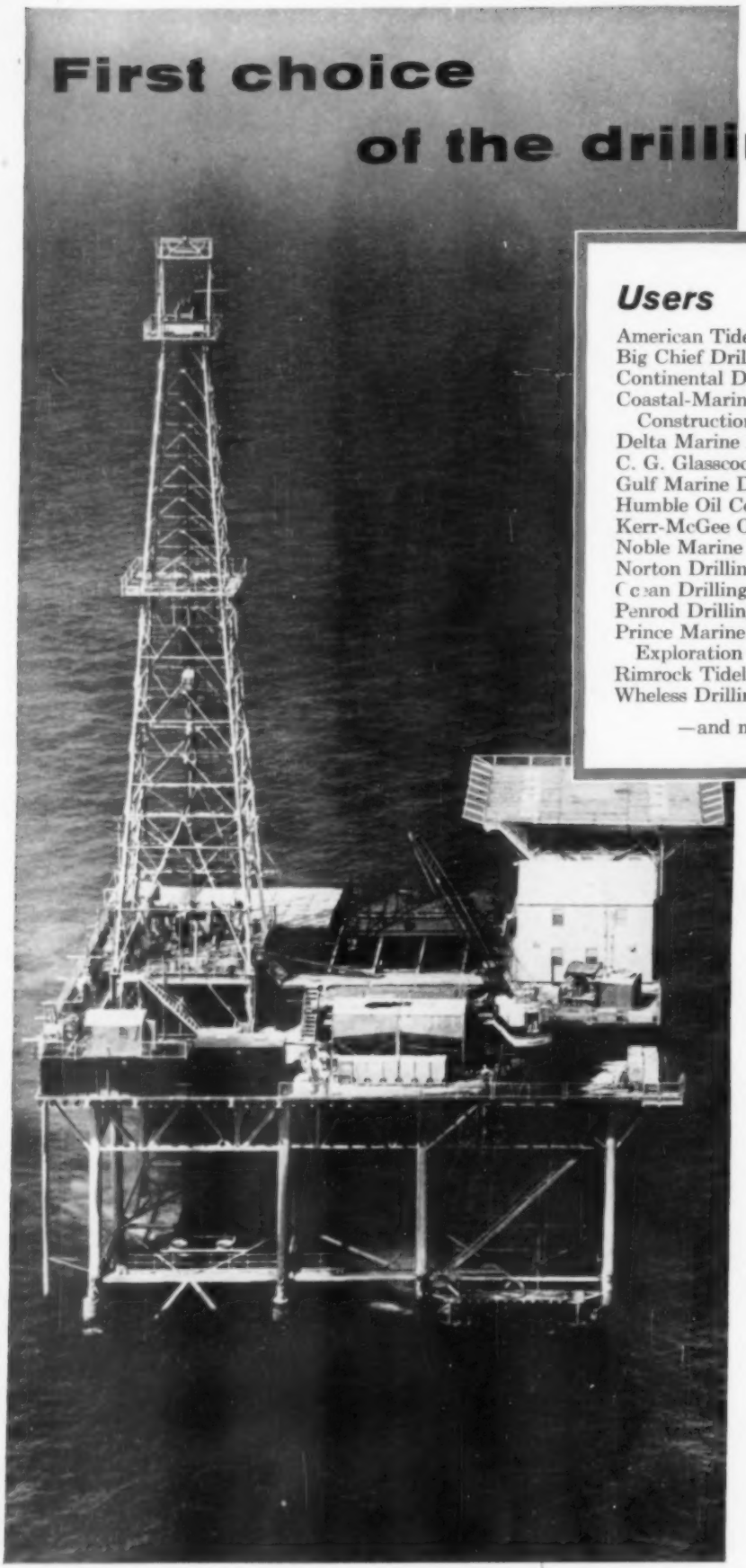

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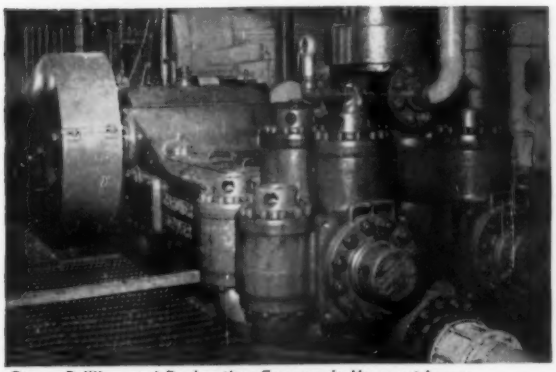
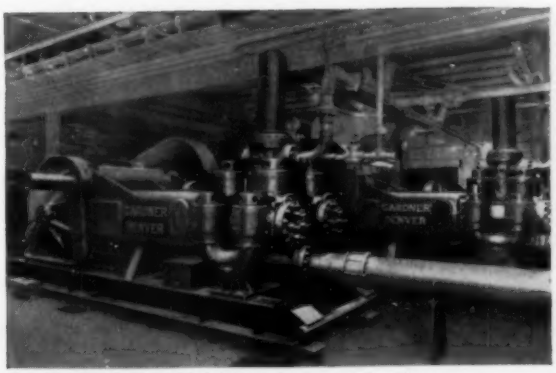
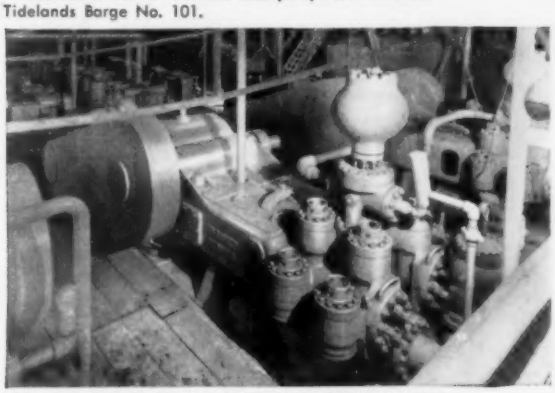


Ocean Drilling and Exploration Company's *Margaret* has a GXQ and two GXR pumps.



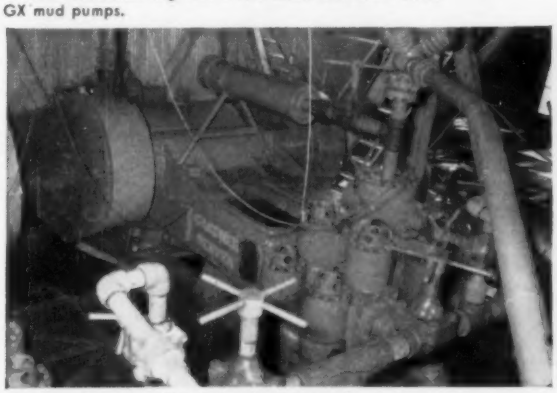
Two Gardner-Denver GR-GXR mud pumps on American Tidelands Barge No. 101.

Continental Drilling barge at Lake Pontchartrain and its GX mud pump.



Rimrock Tidelands Rig No. 3 has three Gardner-Denver GX mud pumps.

Gardner-Denver Model GXR on Glasscock Drilling Company's Rig No. 6.



Gardner-Denver Model GXR mud pump on the Big Chief Drilling Rig No. 34.

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west Texas. Location is at 1 Berrera, in Lot 6, La Huerta Grant. Production in North Santa Cruz field, discovered in 1952, is from four wells completed in a 4,500-ft. lower Frio sand.

Pete MacKellar is contractor on a new wildcat operation in the Clothier area, north of Norman, in Cleveland County, Oklahoma. It is a 7,500-ft. test for T.P. Petroleum Co. at 1 McDaniel, in 5-9n-2w. Location is south of production.

Kirkwood & Morgan, Inc., San Antonio, has a new 5,000-ft. wildcat operation in Live Oak County, South Texas. It is for Lee Brothers Oil & Gas Co. at 1 Jennings, in the G. W. Louis Survey, about 3 miles east of Lagarto.

Offshore Drilling & Exploration Co. will be Shell Oil Co.'s contractor on a deep wildcat test 30 miles off Louisiana's Vermilion parish coast in the Gulf of Mexico. Location is in Block 92, Vermilion area. It is on Shell's OCS-0414 lease. A 11,000-ft. test is planned.

Harms-Burt Drilling Co., Wichita, Kans., is drilling for Ambassador Oil Corp. at a wildcat location 5 miles northwest of Abbyville, in Reno County, South-Central Kansas. Location, at 1 Drenzin, in 13-23s-9w, is 5½ miles east of production in the Zenith-Peace Creek district. Contract is for 4,000 ft.

Atlas Drilling Co. is starting on another F. A. Callery contract in the Laurel Ridge area, of Iberville Parish, southern Louisiana. Current operation is at 5 Hibernia, about a quarter mile northeast of No. 4, completed earlier this month as an oil producer from a 10,120-ft. sand. No. 5, in 65-10s-14e, has a 10,300-ft. permit.

Vick Drilling Co., Winnsboro, La., has a new wildcat operation under way in northwestern Upshur County, East Texas. It is a Woodbine test contracted for F. R. Jackson and John C. Robbins, Jr., of Longview, Tex. Location is at 1 Howard, in the J. M. Henrie Survey, about 9 miles northwest of Bettie. Contract is for 4,600 ft.

Falcon Seaboard Drilling Co., Tulsa and Houston, is the contractor on a projected 15,000-ft. test Union Oil Co. of California is starting at a wildcat location in northwestern Terrebonne Parish, Louisiana Gulf Coast. Location, on Lutcher-Moore land in 23-16s-14e, is near the Assumption Parish line, and about 2 miles south of Amelia field, in the latter parish.

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Gaging, sampling, and testing operations call for . . .

Safety planning—a continuous project

by W. C. Nidever

SAFETY planning has to be a continuous program of safe thoughts and safe procedures of men and supervision to avoid the daily hazards of gaging, sampling, and testing of crude oil and products. Safe procedures are the direct result of safety planning. Safe thoughts are attitudes, slower to develop but lasting in effectiveness.

Normal Physical Gaging Hazards

Numerous hazards exist in the performance of gaging, sampling, and testing operations in all working areas. Some may be pertinent to certain locations and others may exist only in specific locations.

Safe driving is called to our attention continually and, when gaging, cars should not be driven near tanks or equipment where gaseous conditions may exist.

Operations with tanks, valves, pipelines, and associated equipment such as stairways, walkways, firewalls, and valve boxes are all part of a gager's daily work. Some of the hazardous conditions met in the daily work are:

1. Slippery or oily surfaces.
2. Weak or no guard rails.
3. Loose or unprotected walkways.
4. Climbing over or under pipelines.
5. Unsafe tank roofs.
6. Unsafe ladders or stairways.
7. Splintery wooden surfaces.
8. Insufficient working space.
9. Insects in valve boxes.
10. Frozen valves and operating valves on pressure lines to prevent pressure surges.

The gager should report and recommend correction of any such hazardous conditions as he observes them.

All of these hazards can be eliminated or minimized by safety planning. However, conditions occur when only safe thinking of the gager will accomplish the desired results.

Laboratory Hazards

Other gaging hazards exist in laboratory-testing procedures such as faulty glassware, worn or damaged equipment, venting of centrifuge tubes, venting of sample containers or solvent containers. These can be made safe by safe planning, personnel instruction of the existing hazards, frequent inspections, well ventilated working areas, vaporproof lights and fixtures, and no smoking.

First-aid training should be encouraged and first-aid kits should be available in both gagers' cars and in the laboratories, and a check procedure set up to insure that the first-aid kits are kept fully stocked.

Dermatitis is occasionally caused from the too frequent contact with crude oil or products. This can be painful and annoying to the individual, and can be prevented by the use of protective creams.

Hydrocarbon-Vapor Hazards

Petroleum hydrocarbon vapors are flammable and extreme caution to prevent fires should be made. It is common for gagers to occasionally breathe limited amounts of tank vapors while working through gage hatches. In case of limited ventilation or calm air currents, hydrocarbon vapors can be very deadly.

Air contains approximately 21 per cent oxygen and a minimum of 16 per cent oxygen is necessary for the human body to exist. Consequently, exposure to hydrocarbon vapors which contain less than the minimum required amount of oxygen can cause suffocation within a very short time.

Fresh-air masks are necessary when confined valve boxes are entered by workers or when it is necessary to descend on floating-roof tanks during periods of high vapor concentrations. Filter type of masks may remove the hydrocarbon vapors but they will not supply the deficiency in oxygen.

Hydrogen Sulfide Vapor Hazards

Another dangerous gas, with which personnel should be familiar, is hydrogen sulfide vapors. Hydrogen sulfide gas is found in crude-oil production and during the refining of high-content sulfur crude oil. This gas is so poisonous that protective measures must be used for concentrations as low as 50 p.p.m.

The strong odor, similar to that of rotten eggs, is apt to give a false sense of security which is extremely dangerous. A concentration of 100 p.p.m. will paralyze the sense of smell in 2 minutes or less and act as a nerve depressant. Additional exposure to the gas will paralyze the lungs and continued contact results in absorption into the bloodstream.

Wherever hydrogen sulfide gas is known to exist, precautionary measures are continually required. A safe or unsafe condition may occur due to varying conditions such as a change in temperature of the fluid, agitation, rate of hydrogen sulfide gas released from the fluid, type of storage and subsequent release of the vapors, concentration of the gas due to length of confinement, concentration due to vapor space in a tank, settling of the gas in calm weather (specific gravity 1.2), well-production changes, and vapors released from water when tanks are bled.

There are many protective measures that should be taken to detect hydrogen sulfide gas and personnel should be continually alert for any change in conditions that may occur where this gas exists. Some of the more common protective measures are posted warning signs, vapors vented away from working areas, use of hydrogen sulfide detecting ampoules, hydrogen sulfide detector tubes, and the use of safe breathing equipment such as cannisters or air packs.

All gaging work should be done on the windward side of hatches and, in extremely hazardous cases, with a second man standing by on the ground. Both men should be equipped with fresh-air type of masks and know how to use their masks. Gaging should never be done during electrical storms as this gas is flammable also.

Hydrogen sulfide gas usually catches its victims without warning and, although complete recovery can be accomplished by immediate artificial respiration and inhalation of oxygen, fatalities have occurred.

Static Electricity

A potential hazard from static electricity exists every time a gager opens a gage hatch or works where hydrocarbon vapors may be in an explosive mixture.

Static electricity is a description of electrical charges at rest. In this condition we have nothing to fear; however, when motion is introduced in a

Author is with Shell Oil Co. Paper presented at pipeline section, Western Oil and Gas Association, Southern California Industry Safety Conference, Long Beach.

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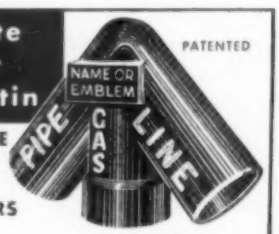

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zone where static electrical charges exist, these charges may move from one medium to another. When this occurs it is possible to have a spark generated.

Some of the most common causes of static in petroleum tankage are high fluid velocities, free fall of liquids, and excessive agitation. Static charges thus generated in tanks will have a tendency to dissipate faster in crude oil than in refined products, and particularly refined products with low vapor pressures.

The following is a brief description of a fire taken from A.P.I. Circular 143:

"A JP-4 fuel tank caught fire during blending operations while a sample was being taken. This 48-ft. cone roof tank had 45 ft. of fluid and a 15-hp. mixer. The mixer was shut off a few minutes prior to drawing the sample with a brass chain. About 35-40 ft. of chain had been let out and, after a wait of a few moments, about 20 ft. of the chain was rewound when the explosion occurred."

This fire is believed to be the result of a static spark either from the liquid to the chain or from the chain to the tank.

The reduction of static charges can be accomplished by inserting ground wires in a tank, by using bonding wires on equipment, or by using a conductive medium to carry off potential electrical charges.

Gagers should always ground themselves and their equipment on the metallic part of a tank prior to opening a gage hatch. All metallic equipment should be kept grounded on the side of the gage hatch while running the equipment in and out of a tank. It should always be remembered that it takes only 1.5 per cent of petroleum vapors combined with air to create an explosive mixture and that any spark will cause this mixture to explode. It is believed that special conditions are necessary to generate an explosion by a static charge, but our principal aim is to prevent these conditions from occurring by safety planning.

How safety planning affects pipeline-replacement jobs

by B. J. Stussy

THE main issue involving safety in any pipeline replacement is careful planning. Usually, the first phase of any planning is to contact the pipeline dispatcher to obtain clearance of the line in which a section replacement is to be made. After the replacement is scheduled, the job foreman should review the proposed work with the crew involved and stress all safety precautions that are anticipated for the entire scope of the particular job.

Replacement procedure . . . The actual proceedings, in normal sequence, are as follows:

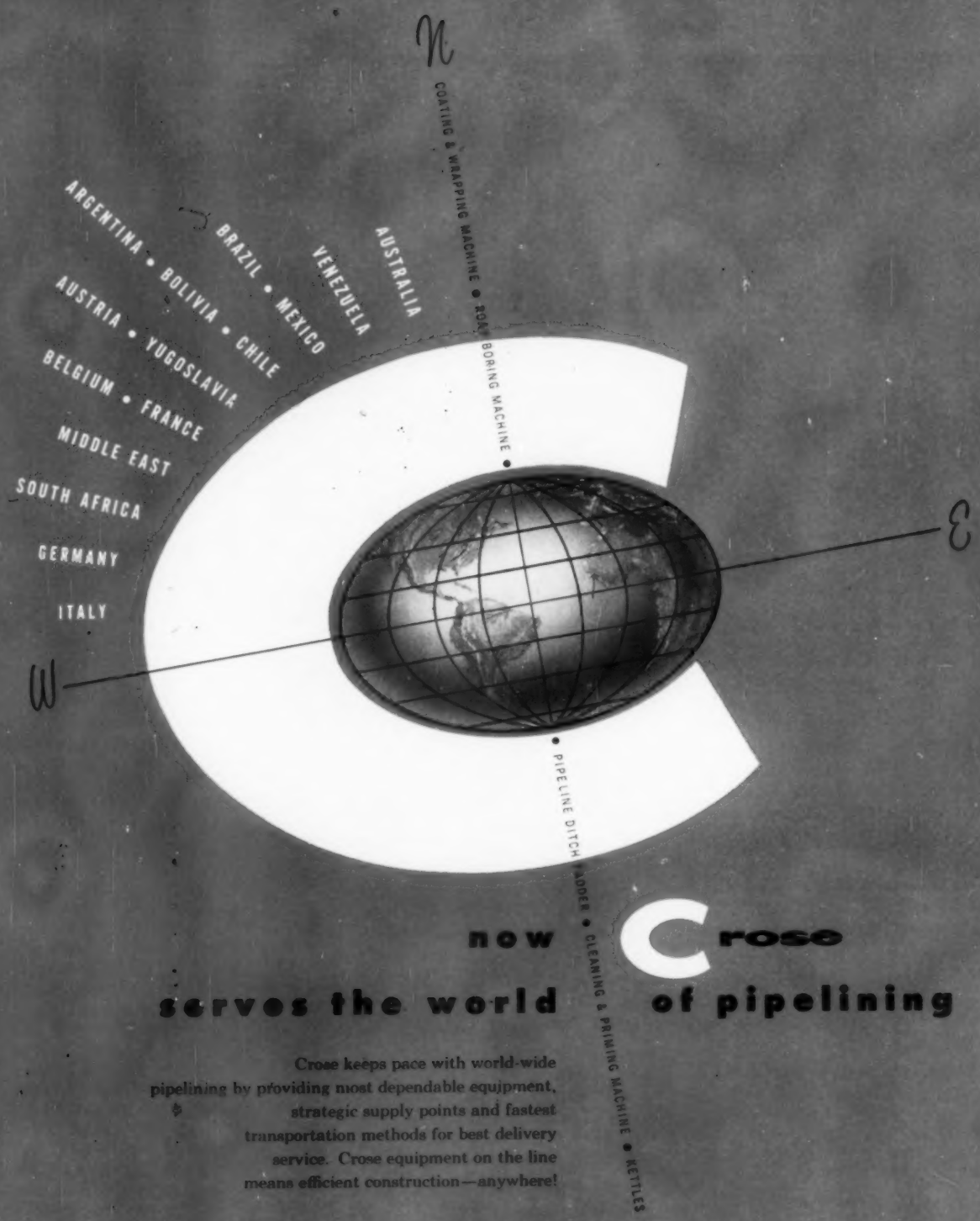
A portable pump is installed at the nearest valve to pump oil from the isolated section. All valves that are used to isolate the section must be closed and blinded, or if this is impractical, they should be closed and locked and the keys to the locks retained by the foreman. When all valves have been secured and the pressure on the line released, the portable pump may be placed in service to drain the section.

During the time the line is being drained, a 1-in. collar is welded to the top of the line at each end of the section about 75 ft. outboard from where the cuts are proposed to be made. These collars are to be used for vents later in the job.

The old section of line is then trenched over and bell holes dug at each end of the line where the cuts are to be made. These holes should be large enough to allow adequate space for as many men as may be working at any one time. They should have sloped sides to allow for convenient and fast exit from the hole in case of emergency.

The new section of line is then lined up and welded along side of the old section. Before the old line is cut, a bond wire is installed across the

Author is with Richfield Oil Corp. Material from paper presented at San Joaquin Valley Oil Industry Safety Conference, sponsored by Western Oil and Gas Association, Bakersfield, Calif.



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Pictured (left to right) Alfred Scheer, Shaw, Metz & Dolio electrical engineer; George Nejdl, asst. electrical engineer for Shaw, Metz & Dolio; P. R. Ellingson, plant engineer, Johnson Motors; R. S. Terhune, Nelson sales representative.

NELSON

helps make your Johnson outboard motors

Seven Nelson unit substations similar to the one pictured above were used in the new Johnson Motors die cast expansion at Waukegan, Illinois. Each unit, compactly designed for ease of operation and maintenance, controls the flow of power to a section of the plant.

The unit shown is substation No. 3. This is a 1,000 KVA unit, rated 12,000 volt delta primary to 480 volt Wye 277 volt secondary, and incorporating Nelson Class 722 low voltage switchgear. This gear includes 1 — 50,000 AIC main and 8 — 25,000 AIC feeder breakers, and has fully equipped spaces for five additional future feeder breakers.

Thanks to the close cooperation on the part of Shaw, Metz & Dolio, architects and engineers of Chicago, the engineer at Johnson Motors, and the contractor, Aldridge Electric Company with Nelson Electric Manufacturing Company, this installation was made to the *complete satisfaction* of all parties.

When you need any type of electrical control equipment, consult NELSON. The type of team work that made the Johnson Motors installation possible can help you streamline your plant for more efficient operation.

To learn more about Nelson Electric Manufacturing Company please write for pictorial index and brochure describing our new plant.

a major source of electrical control equipment for industry

NELSON *Electric* MANUFACTURING CO.

TULSA, OKLAHOMA

PIPELINE PATROL

proposed cut to prevent static sparking when the line is cut. Care should be taken to insure that the clamps holding the wire are making good contact with the pipe. The bond wires must remain intact until the old line has been cut and removed from the trench.

A vacuum truck is located near the cut, approximately 50 ft. away, with a hose extending into the bell hole to salvage the line drainage. During this time, two men are stationed at the bell hole with fire extinguishers—all other personnel except those doing the line cut should be moved away from the salvage area.

After the line has been cut at each end and drained, the old section is removed. A new ditch is then dug with a trencher to accommodate the replacement section. The two collars that were welded to the line earlier are now drilled through and about 20 ft. of 1-in. pipe is installed at each collar to act as vents while the new section is being welded in place. After the vents are installed, the bell holes are cleaned out and line packs are made ready for insertion into the line.

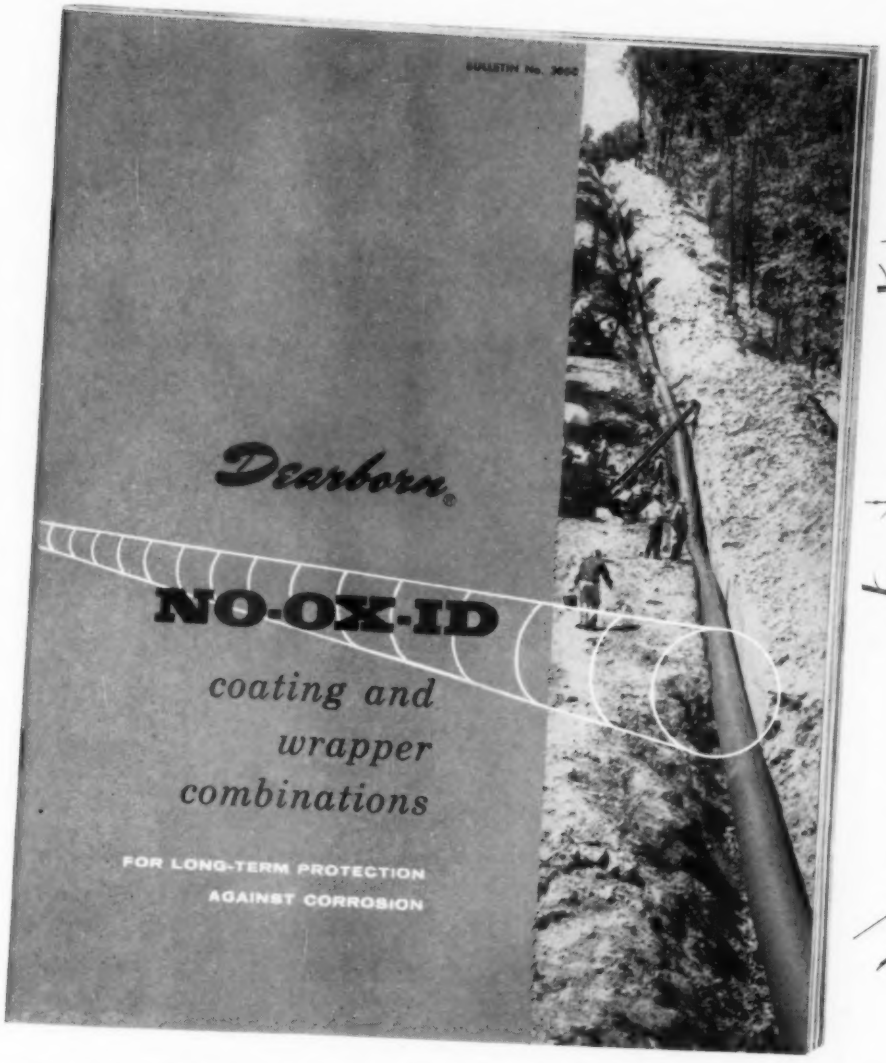
The line packs are very important because they prevent oil drainage and vapors from entering the welding areas from the other portions of the line.

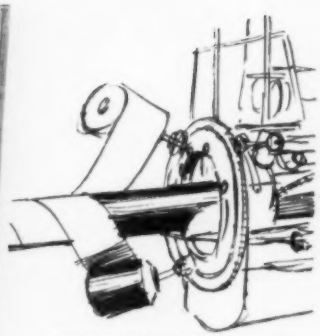
The new section of line is then lowered into the ditch and is ready for welding to the existing line. The welding truck should be parked approximately 75 ft. from the bell holes or farther away depending on atmospheric conditions. The weld areas are tested for vapors by patented devices, if possible, and then the welder should swing his torch into the bell hole while all other personnel remain at a distance. The line is then scarfed by the welder and tied into the existing line.

After the new section of line has been welded in place, the line packs are jarred loose with sledge hammers—especially if damp earth has been used as a pack. The vent lines are removed from the collars and plugs are installed as a permanent installation.

The foreman must then review the job for completion, such as covering the new section, changing all blinds, if any, and making sure that the section is lined up for the predetermined flow.

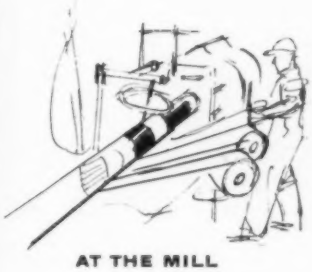
The foreman then contacts the pipeline dispatcher to release the line for use. After release of the line the area is cleaned up and the job is considered complete after the flow has returned to normal.





BY TRAVELINER

BY HAND



AT THE MILL

UP-TO-DATE INFORMATION ON PIPELINE PROTECTION ...NEW NO-OX-ID CATALOG

Dearborn has compiled a new 12-page illustrated catalog describing the latest approved methods of coating and wrapping underground or underwater pipe for long-term protection. Every pipeline contractor, utility and private operator will want a reference copy.

The catalog describes NO-OX-ID compounds and NO-OX-IDized Wrapper combinations developed for corrosion control under all soil conditions. It tells how to apply NO-OX-IDs, hot or cold, by Traveliner, by hand or at the mill... how to get more pipe coverage with less equipment and smaller coating crews.

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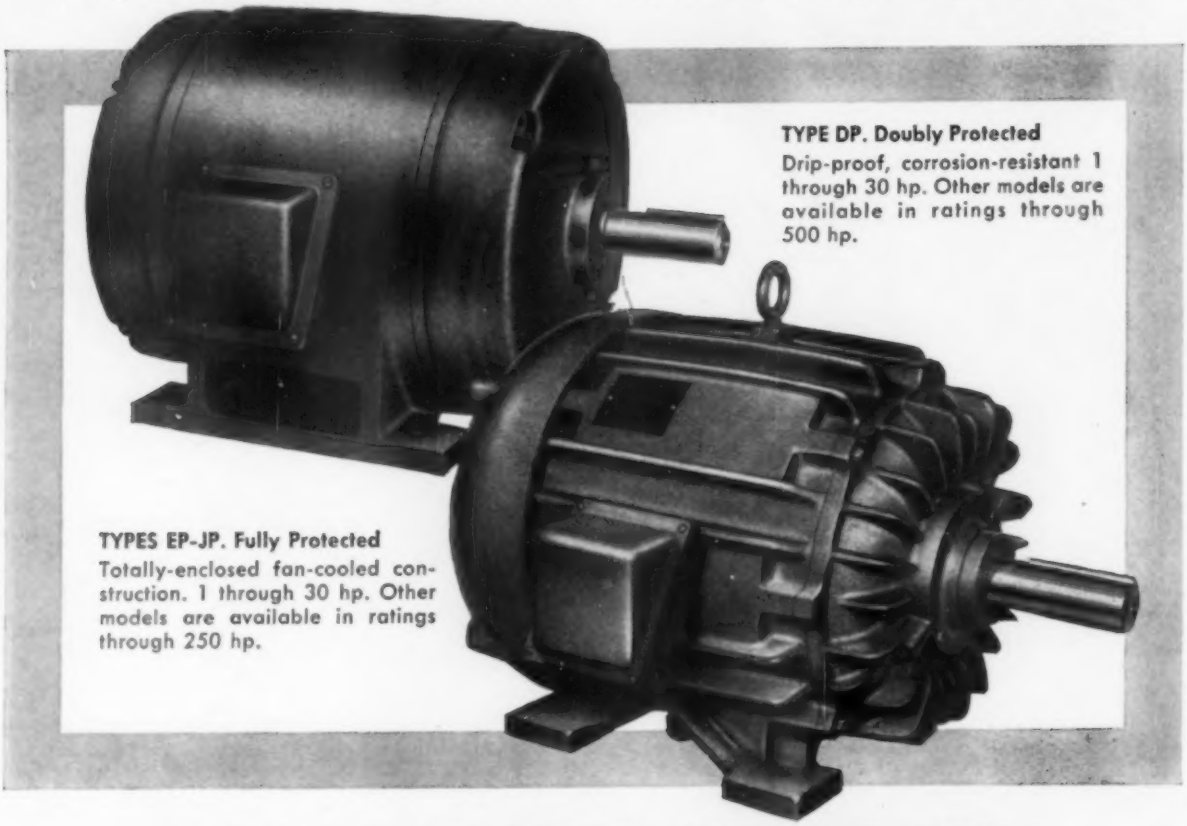
WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY


TYPE DP. Doubly Protected
Drip-proof, corrosion-resistant 1 through 30 hp. Other models are available in ratings through 500 hp.
TYPES EP-JP. Fully Protected
Totally-enclosed fan-cooled construction. 1 through 30 hp. Other models are available in ratings through 250 hp.

PRODUCTION STAYS UP

when you power equipment with these Wagner Motors

Production is maintained when motor down-time is curtailed. To meet the petroleum industry's demands for more dependable production, Wagner has designed these polyphase motors with *extra* protection that cuts time-out for motor maintenance to a minimum.

These motors pack more power in less space—1 through 30 horsepower in NEMA frame sizes 182 through 326 U.

EXTRA PROTECTION—Type DP is doubly protected by a rugged corrosion-resistant cast iron frame and by completely drip-proof enclosures.

Types EP and JP are totally enclosed against dust, grit, fumes or moisture—protected against corrosion by cast iron frames. Type JP is explosion proof as well.

COOL RUNNING—Both types are cool running. Blowers and special baffles direct cooling air through the DP motor. Types EP and JP are fan-cooled and are built with ribbed frames to increase the cooling surface.

LONGER BEARING LIFE—Original bearing lubrication will last for years in service under normal conditions, but openings are provided in the bearing housing to add fresh grease—remove old grease when required.

Let a Wagner motor application engineer show you how well these motors can fit *your* needs. Call the nearest of our 32 branch offices, or write us. Bulletins MU-202 and MU-203 give complete information on these Wagner Motors. Write for your file copies today.

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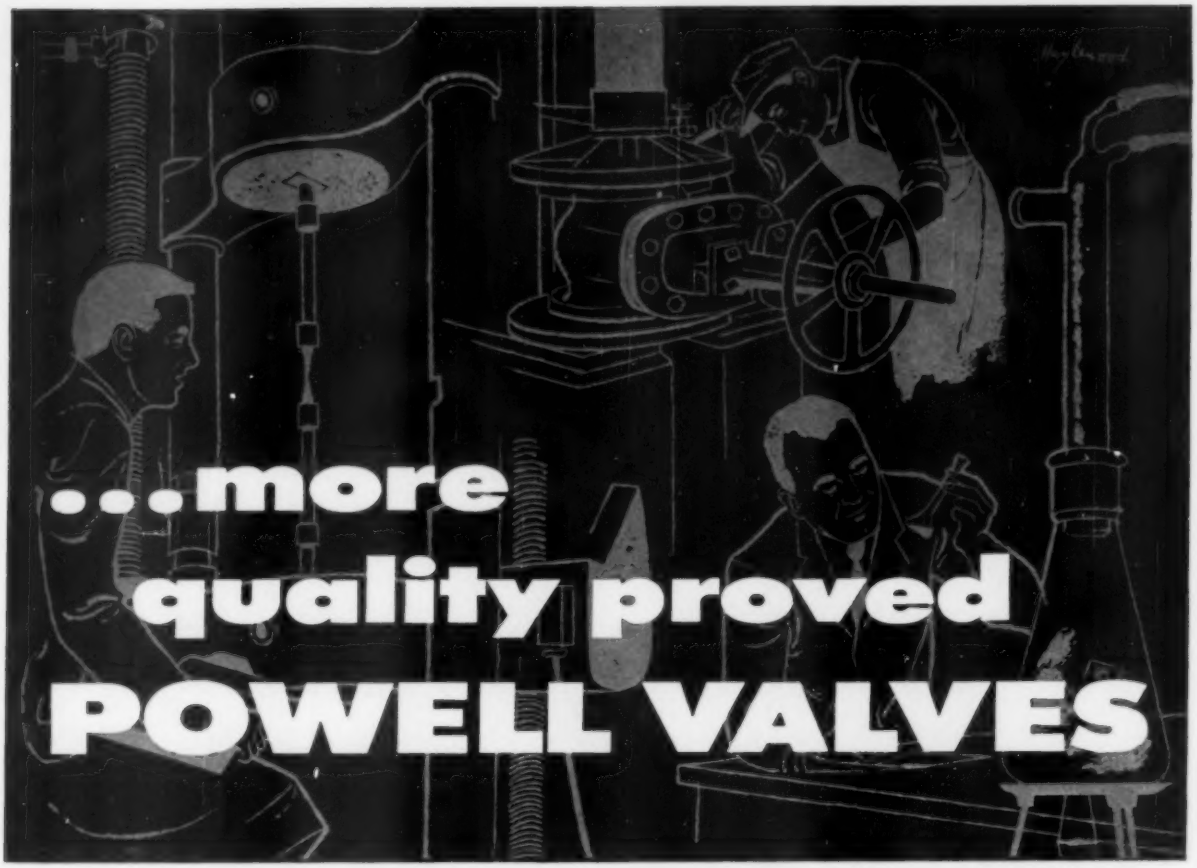
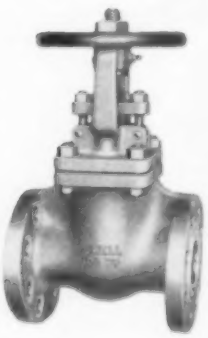


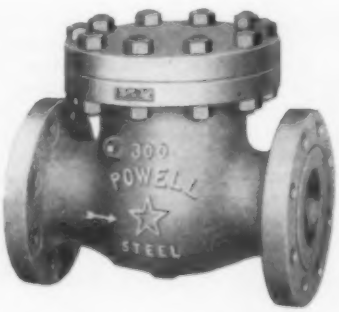
FIG. 375—Bronze "White Star" Gate Valve for 200 pounds W.S.P.

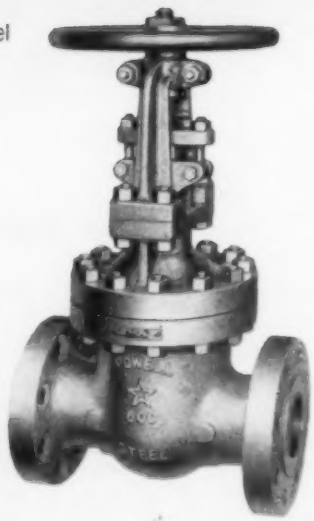
FIG. 2467—Stainless steel O.S. & Y. Gate Valve for 300 pounds W.P.

FIG. 6003—600-pound Steel O.S. & Y. Gate Valve

FIG. 3061—300-pound Steel Swing Check Valve







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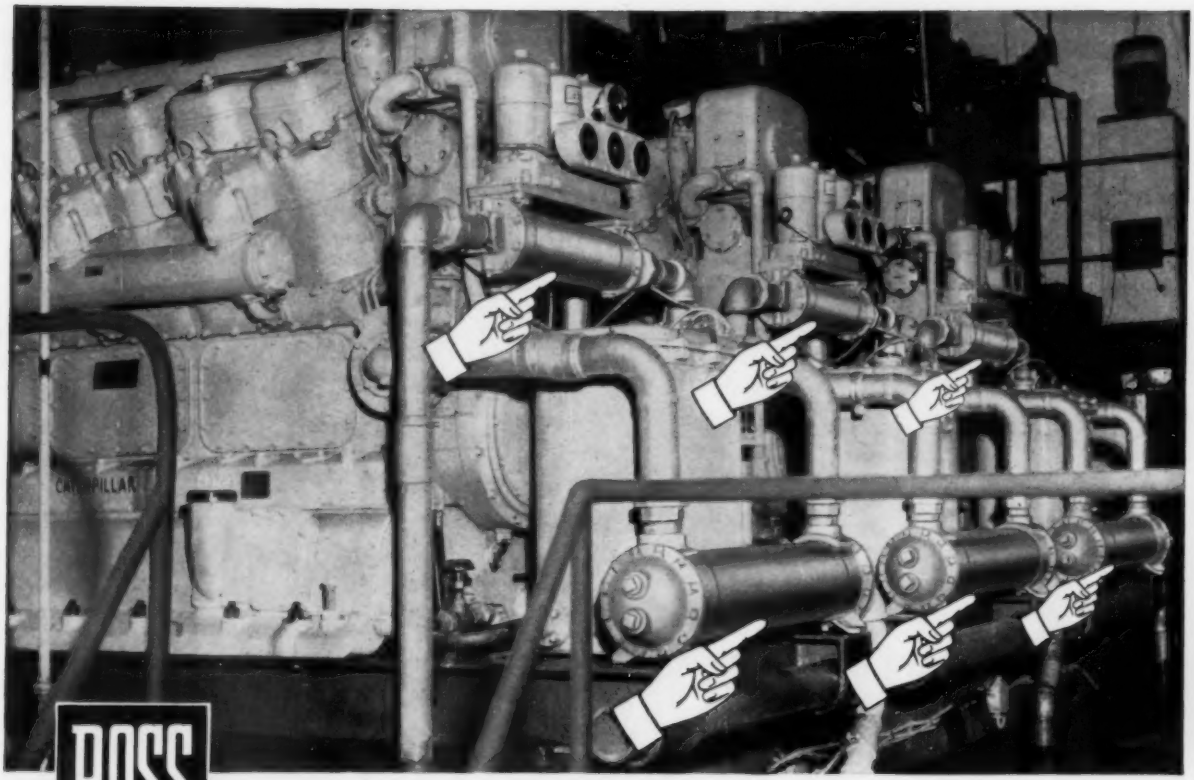


ROSS

ROSS EXCHANGERS

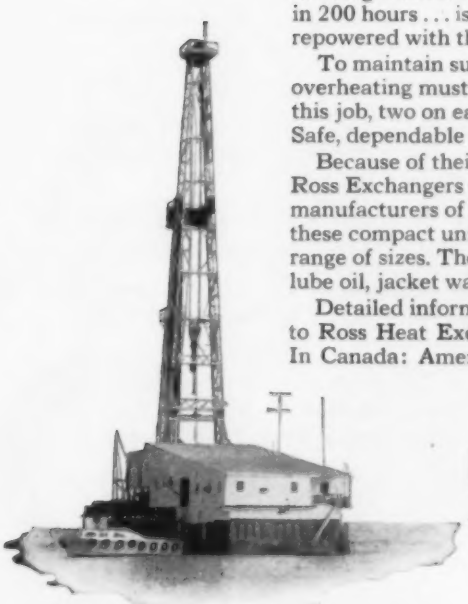
keep these 3 Caterpillar Diesels purring on 9700 ft. drilling job

Drilling 3 holes totalling 24,000 feet . . . the last one 9700 feet deep in 200 hours . . . is the record of this draw works barge since it was recently repowered with three Caterpillar Diesels.

To maintain such a pace, peak performance is demanded all the way. Engine overheating must be guarded against at all times. Ross Exchangers do this job, two on each engine . . . one cools lube oil, the other jacket water. Safe, dependable temperatures are assured.

Because of their high thermal efficiency and on-the-job record for ruggedness, Ross Exchangers are widely preferred throughout the industry by manufacturers of many types and makes of oil field machinery. Easy to install, these compact units are pre-engineered and fully standardized in a broad range of sizes. They're the ready answer to your temperature control needs . . . lube oil, jacket water, air and hydraulic fluid.

Detailed information may be obtained by directing a request for Bulletin 1.1K5 to Ross Heat Exchanger Division of American-Standard, Buffalo 5, N. Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.



ROSS HEAT EXCHANGER

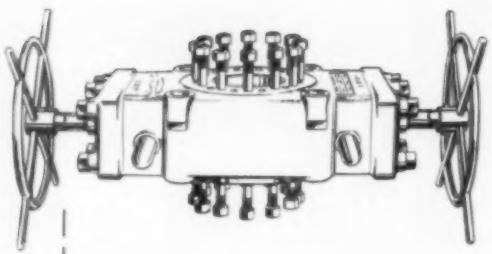
Division of AMERICAN - Standard

AMERICAN-Standard PRODUCTS

Perfect for Work-over Rigs . . .

Guiberson BLOWOUT PREVENTER

with Chain Drive



TYPE A
BLOWOUT PREVENTER
MANUAL DRIVE

- This work-over special is also ideal for small hole drilling.
- Chain drive provides tight seal with one man operation.
- Two types — A for working pressures to 3000 psi (6000 psi test) — 7⅜" opening. Manual or chain drive.

  B for working pressures to 2000 psi (4000 psi test)—9-1/16" opening. Chain drive only.
- Short and compact design — body is only 11½" high.
- Keeps well head equipment close to ground.
- Designed to use two preventers in combination without need of flanged adapters.
- Connecting tie bolts and nuts furnished at no extra cost on original sale of dual preventers.
- Universal slide designed to handle blank rubbers or 2", 2½", 3", 3½", 4" tubing sizes or 5½", 7" casing sizes.

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ONE OF THE DRESSER INDUSTRIES

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Everywhere

Statement of Condition

AT THE CLOSE OF BUSINESS JUNE 6, 1957

RESOURCES

Cash and Due from Banks	$66,696,062.39	
U. S. Government Securities	61,573,205.91	
Other Bonds and Warrants	14,641,363.00	$142,910,631.30
Loans and Discounts		82,860,682.11
Income Receivable Accrued		472,326.41
Stock in Federal Reserve Bank		360,000.00
Bank Premises		4,000,000.00
Customers' Liability Under Letters of Credit		297,555.48
TOTAL		$230,901,195.30

LIABILITIES

Deposits		$211,136,597.73
Letters of Credit Outstanding		297,555.48
Income Collected, Not Earned		422,786.04
Reserve for Taxes, Interest, Etc.		1,622,443.16
*Dividends Declared, not yet payable		125,000.00
Capital—Common	$ 5,000,000.00	
Surplus	7,000,000.00	
Undivided Profits and Reserves	5,296,812.89	17,296,812.89
TOTAL		$230,901,195.30

*Payable June 14, 1957

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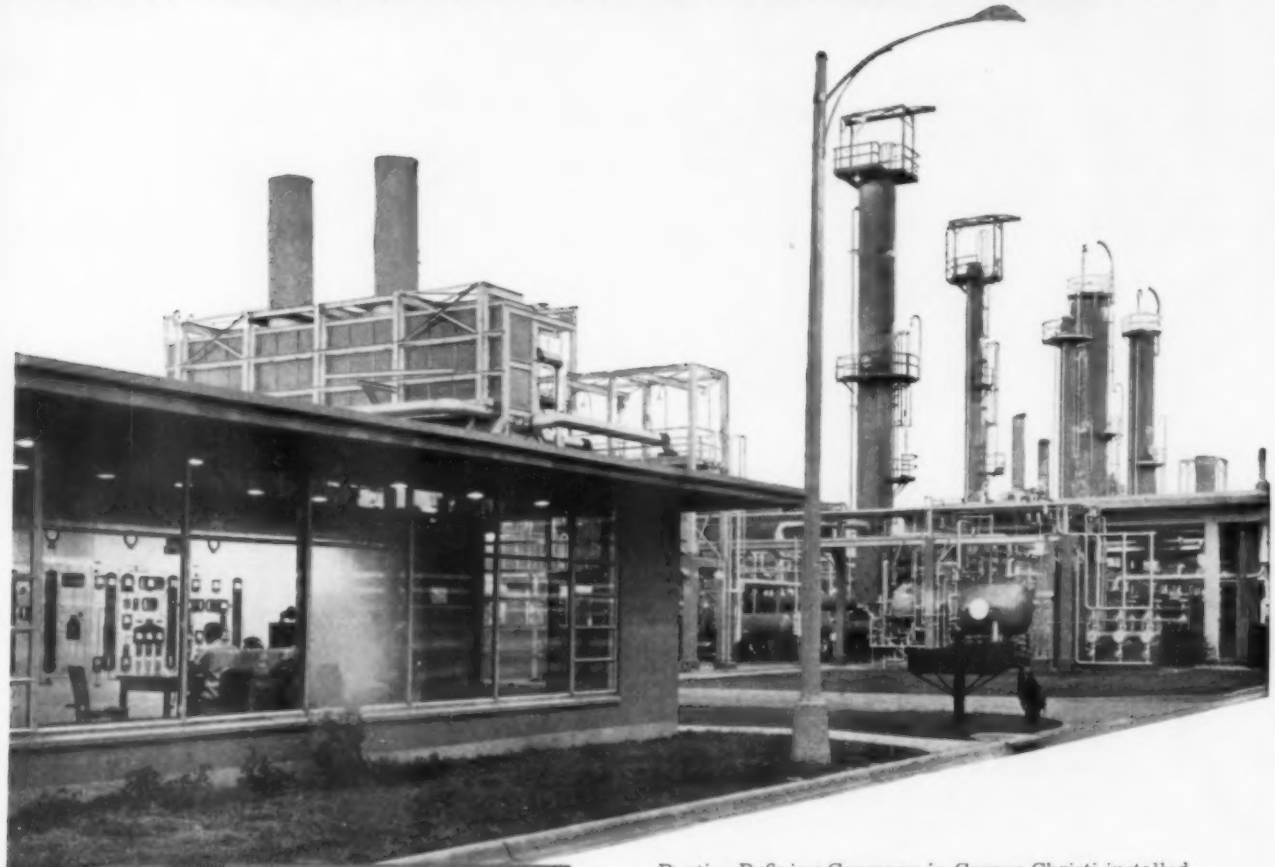
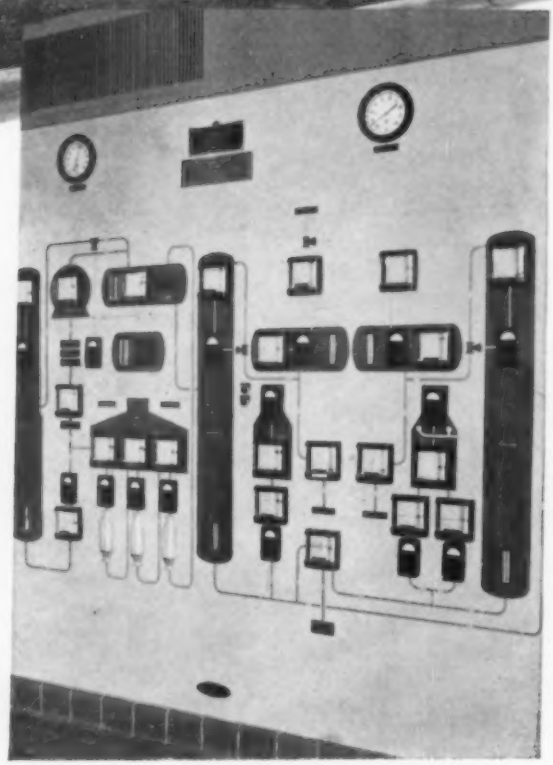
OKLAHOMA'S 50TH ANNIVERSARY

THIS REFINERY GOES ELECTRONIC...





Pontiac Refining Company in Corpus Christi installed a new reformer in 1956 to produce 100+ octane gasoline. Because distances from the control house to the process range up to 800 feet and some of the variables were difficult to control, 'American-Microsen' Electronic Instruments were selected.

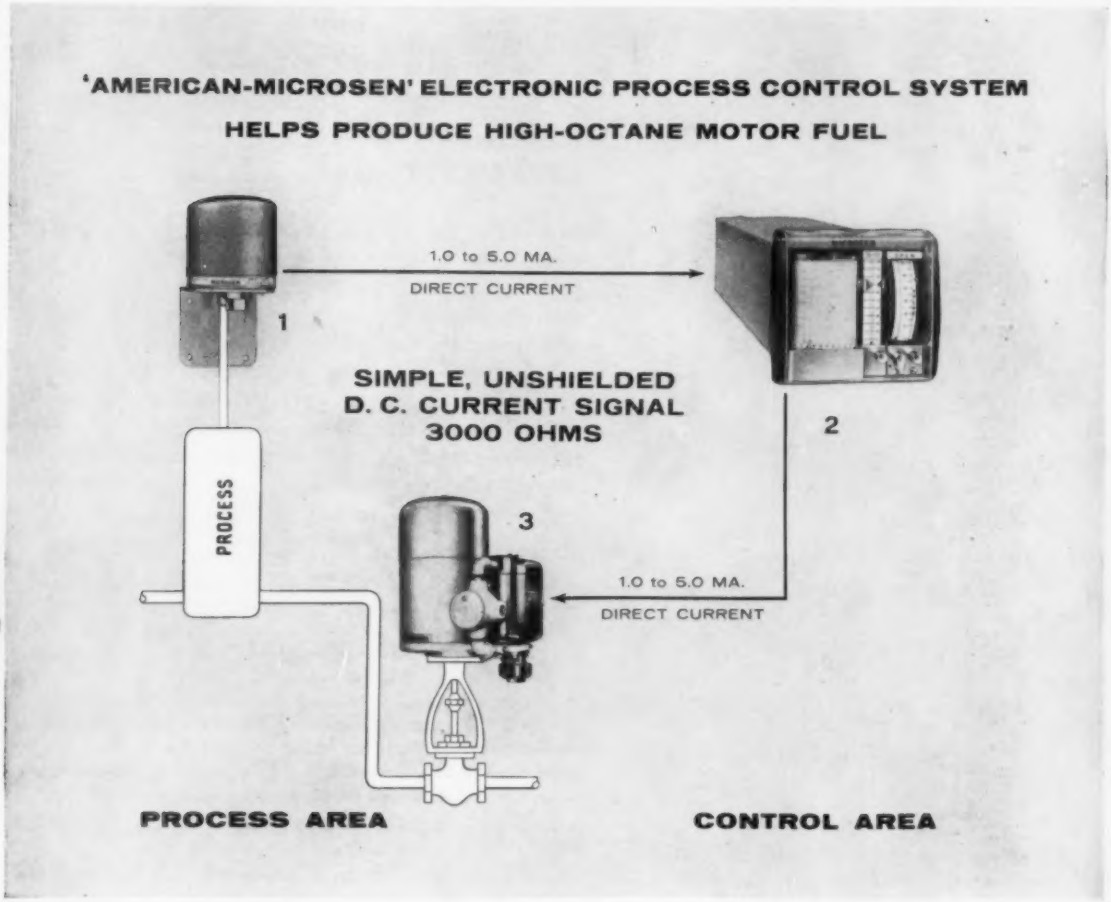
The control house contains 'American-Microsen' Controllers for pressures, flows, levels, and temperatures of the process materials at vital stages of the platforming process. Despite the long distances and fast-acting variables, the instruments provide control well within the tolerances required to produce high-octane motor fuel.

Such results are possible because the 'American-Microsen' System is completely electronic, with dc transmission signal that is insensitive to distances as great as 30 miles. The high speed and sensitivity of the electronic design improve the control of all process variables.

Now in operation over a year at Pontiac Refinery, the 'American-Microsen' System continues to give complete satisfaction — continues to help turn out high grade motor fuel. It is typical of many successful installations, and more and more companies are specifying the system for new plants as well as in modernizing existing processes.

Even though the electronics approach in process control is revolutionary, the 'American-Microsen' System of today incorporates the latest design techniques. Transistors are used for the ultimate in reliability and service life, and printed circuits and miniaturized components provide space-saving simplicity. The complete process control system now uses only three units.

the modern way to control process variables



1. **TRANSMITTER.** 'American-Microsen' transmitters are used for measuring pressure, temperature, differential pressure, liquid level, flow, and other process variables. The "Microsen" balance creates a stable dc signal for long distance transmission. Transmitters have a minimum of bearing pivots or linkages—assuring sensitivity and repeatability of measurement.

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Where required, the 'American-Microsen' Electro-Pneumatic Valve Positioner or the Electro-Pneumatic Transducer can be supplied.

In automating your processes for higher product quality and greater operating economy, you want the better control and simplified servicing provided by the 'American-Microsen' Electronic Process Control System. We invite you to meet with one of our sales engineers to determine the best equipment for your service. Write for literature.

MANNING, MAXWELL & MOORE, INC.

MANNING MAXWELL & MOORE INC. TRADE MARK

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Fast-moving . . . fast-operating . . . economical—for complete flexibility in conventional drilling, slim hole drilling, servicing or work over. Completely unified, this Cardwell design combines rugged draw works elements into a bridge-type trailer frame. Unit includes a 103-foot tubular or a structural type four-leg telescoping mast. An outstanding rig—with high strength-to-weight ratio—packed with outstanding field tested and proved features!

THESE FEATURES STAND OUT

★ MUD PUMP DRIVE (optional) in twin-engine mechanical version becomes an integral part of the engine compounding arrangement. ★ CATHEAD SHAFT is located ahead of the driller for added safety. ★ MAST PIVOTING does not interfere with well head connections. ★ AIR ACTUATED CLUTCHES used throughout. All controls centralized at platform for safe, convenient operation. ★ COMPLETE SAFETY-TYPE CONDUIT LIGHTING SYSTEM for trailer and mast. ★ SUB-STRUCTURE has ample blowout preventer clearance and does not require trailer ramps.

For full information: Call your Cardwell Representative.

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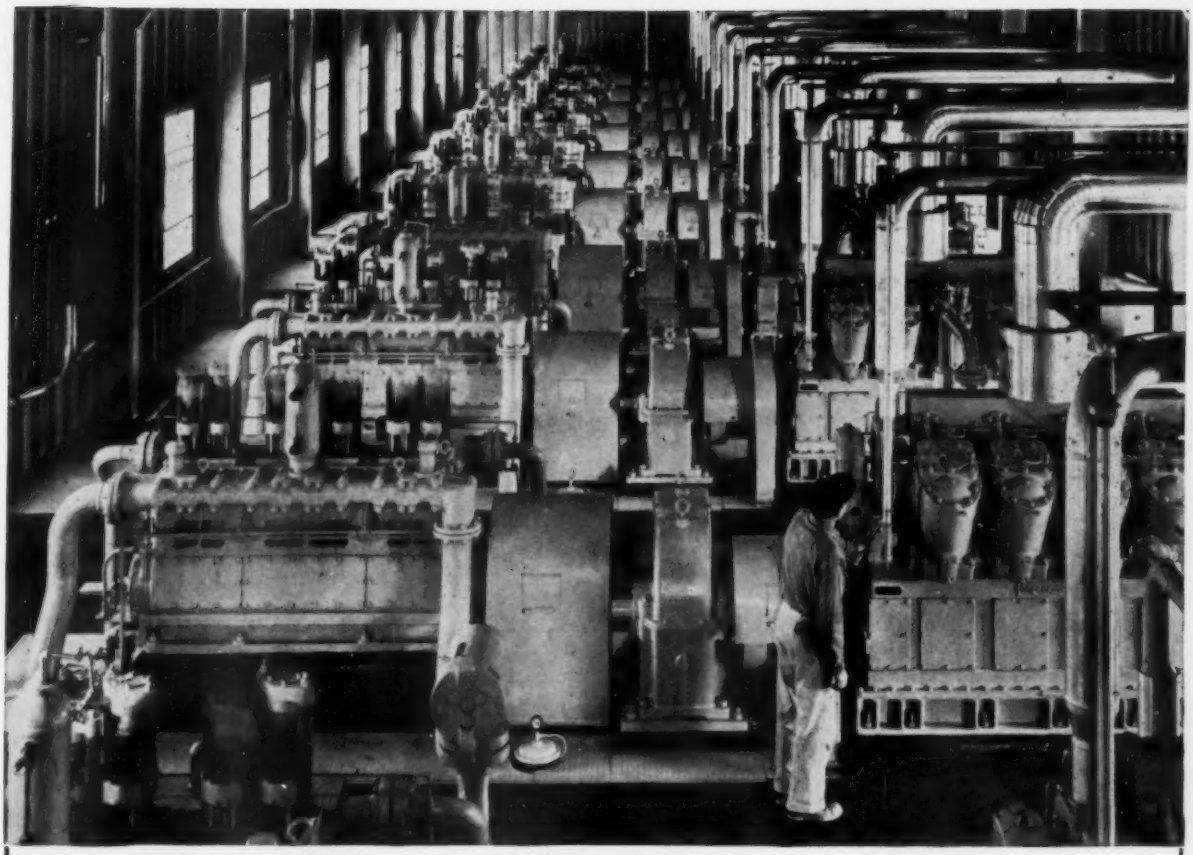


FIELD REPORT

FLOOD: North Ward-Estes Unit

PUMPS: 10 Aldrich Septuplex

FLOODING STARTED: December 1954

EXPERIENCE TO DATE:

Pumps operate constantly — 168 hours per week. There have been no breakdowns ... customer reports installation highly satisfactory ... "Maintenance actually has been less than we expected."

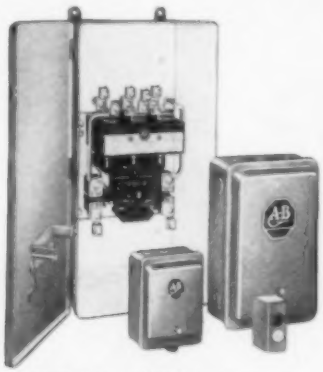
Field parts stock available in Carmi, Ill., Charleston, W. Va., Houston, Los Angeles, Odessa and Tulsa. For further information, write the Aldrich Pump Company, 3 Gordon Street, Allentown, Pa.

the toughest pumping problems go to ALDRICH

TROUBLE FREE MOTOR STARTERS FOR THE OIL FIELDS

Most starters, in the oil fields, must be watertight or explosion-proof. This calls for bolted enclosures which are a time-consuming job to open and close for inspection. The way to lick this situation is to install Allen-Bradley solenoid starters, because they do not need regular inspection. The double break, silver alloy contacts are always in good operating condition. Furthermore, their simple construction . . . only one moving part . . . does away with pins, pivots, bearings, or jumpers. You can safely install Allen-Bradley starters . . . and practically forget them. They are good for millions of trouble free operations.

CIRCULATING PUMP (one of 28 pumps with Allen-Bradley starters) in Neches, Texas.



Allen-Bradley solenoid starters are available in 8 sizes—up to 300 hp, 220 v; 600 hp, 440-550 v.

PUMPER (one of 17 equipped with A-B weatherproof starters) in Oklahoma.

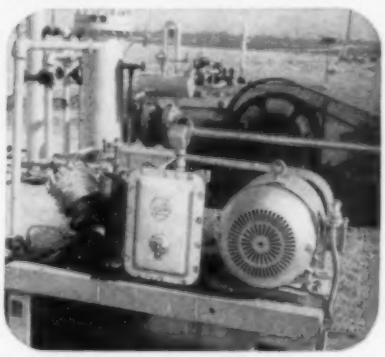
LOADING PUMPS with A-B explosion-proof starters in Denton, New Mexico.

The two outstanding reasons for the popularity of Allen-Bradley solenoid starters in the oil fields:

1st—Simple construction . . . ONLY ONE MOVING PART.

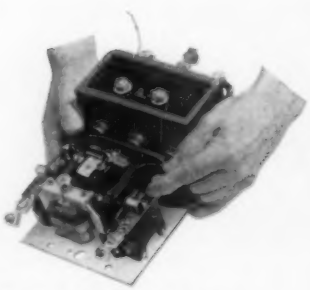
2nd—Contacts require no cleaning, filing, or dressing.

No pins, pivots, or bearings to gum up and stick . . . no flexible jumpers to break.

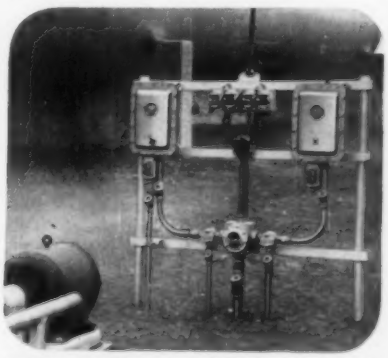


COMPRESSOR with A-B starters at L.P.G. loading terminal at Stanton, Texas.

TANK FARM installation of Allen-Bradley watertight starters in Lake Charles, La.



Two thermal solder pot relays give accurate, dependable overload protection. They are reliable even after long inactive service.

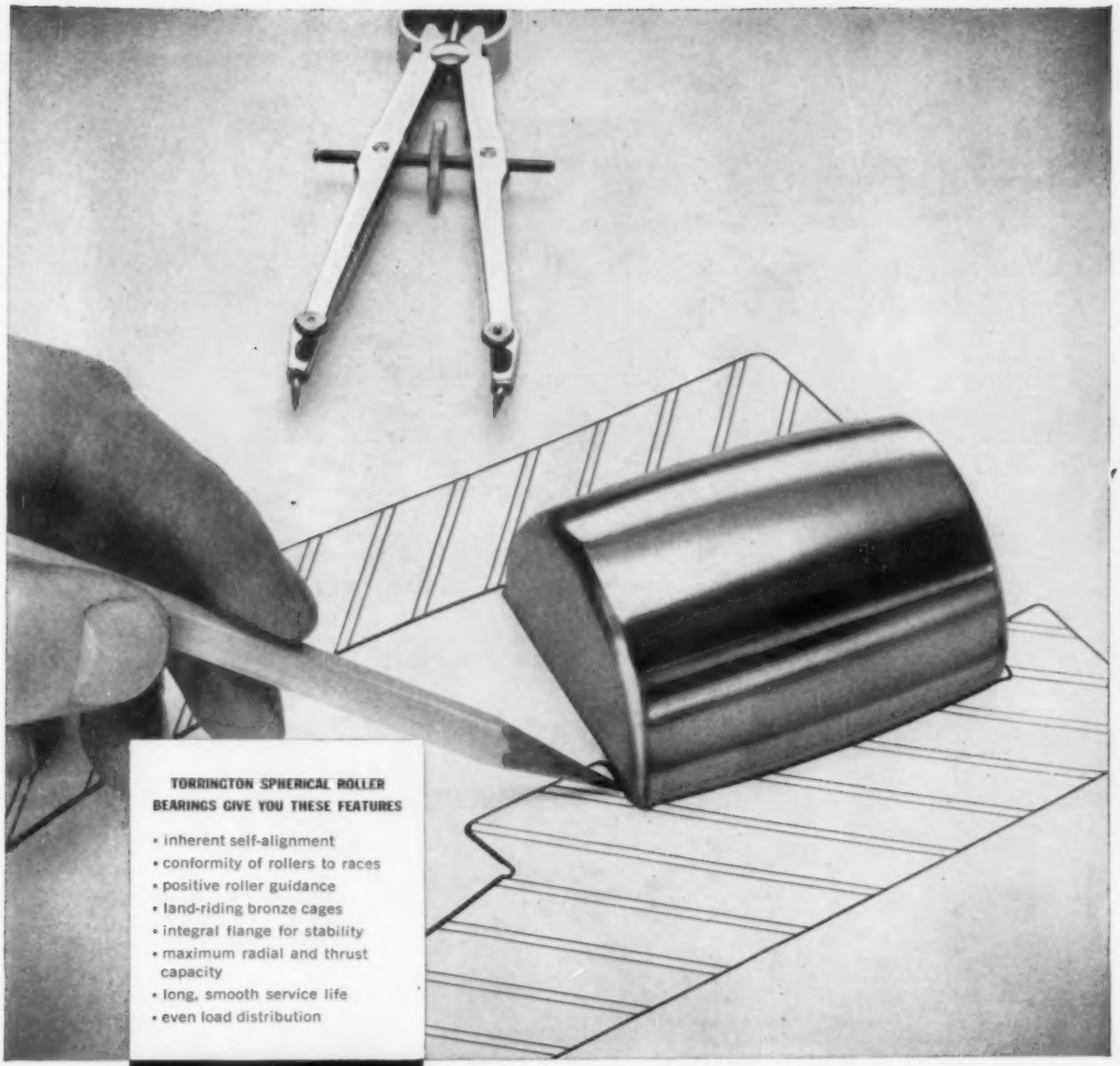


LOADING PUMP with A-B controls at L.P.G. terminal in Midland County, Texas.

Allen-Bradley Co.
1304 S. Second St.
Milwaukee 4, Wis.

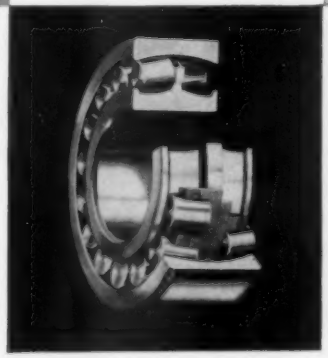
ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

In Canada—
Allen-Bradley Canada Ltd.
Galt, Ont.



TORRINGTON SPHERICAL ROLLER BEARINGS GIVE YOU THESE FEATURES

- inherent self-alignment
- conformity of rollers to races
- positive roller guidance
- land-riding bronze cages
- integral flange for stability
- maximum radial and thrust capacity
- long, smooth service life
- even load distribution



Mated perfectly ~ for life!

Make a point to notice the roller end and center guide flange in a Torrington Spherical Roller Bearing. The perfect mating there means a smoother, longer bearing life.

Roller end and flange surfaces alike are ground to a common spherical radius centered on the common vertex of bearing axis and roller axis. Under all load conditions, the rollers bear lightly but constantly against this flange. This guides the roller positively with minimum friction and prevents skewing. Stress concentrations leading to early failure are avoided, so the bearing will serve you many good turns longer.

This is the kind of feature Torrington builds into its bearings out of its experience with all major types serving in all kinds of equipment. Care for such details is matched only by our care in mating the *right* bearing to the *right* job. In this, your Torrington representative is an expert: call on him when you need help. *The Torrington Company,* South Bend 21, Ind.—Torrington, Conn.

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

"All UNIONS aren't the same -- specify WECO by name"

Examine a WECO Union and you will see that all unions are not the same.

The difference is readily noted in WECO'S metal-to-metal ball and cone seat that is unequaled for positive, leak-proof sealing under the severest conditions.

The ease and speed of repeated make-up and break-out is apparent in the sturdy, accurately cut Acme threads.

The extra strength of WECO Unions is evident in the heavier wall sections that are machined and knurled for uniform wall thickness and safer wrenching . . . in the sturdy wing nut that takes heavy hammering as a matter of course.

These differences in design and construction make WECO Unions superior in sealing and economical in service. That's why it pays to specify WECO Unions by name, from supply stores everywhere.

U-13-56

WECO®

WELL EQUIPMENT MFG. CORP.
HOUSTON, TEXAS

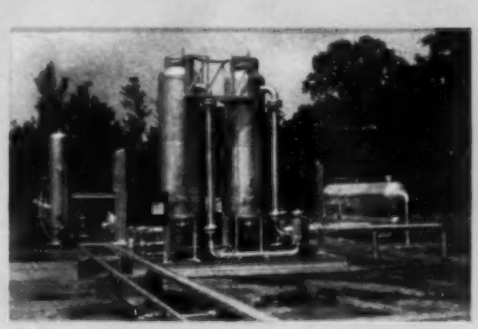
Division of CHIKSAN COMPANY *a subsidiary of*
FOOD MACHINERY AND CHEMICAL CORPORATION

DELTA ANNOUNCES DRYEX®

The newest, most economical and efficient method for the recovery of natural gasoline from small volume lean gas streams.

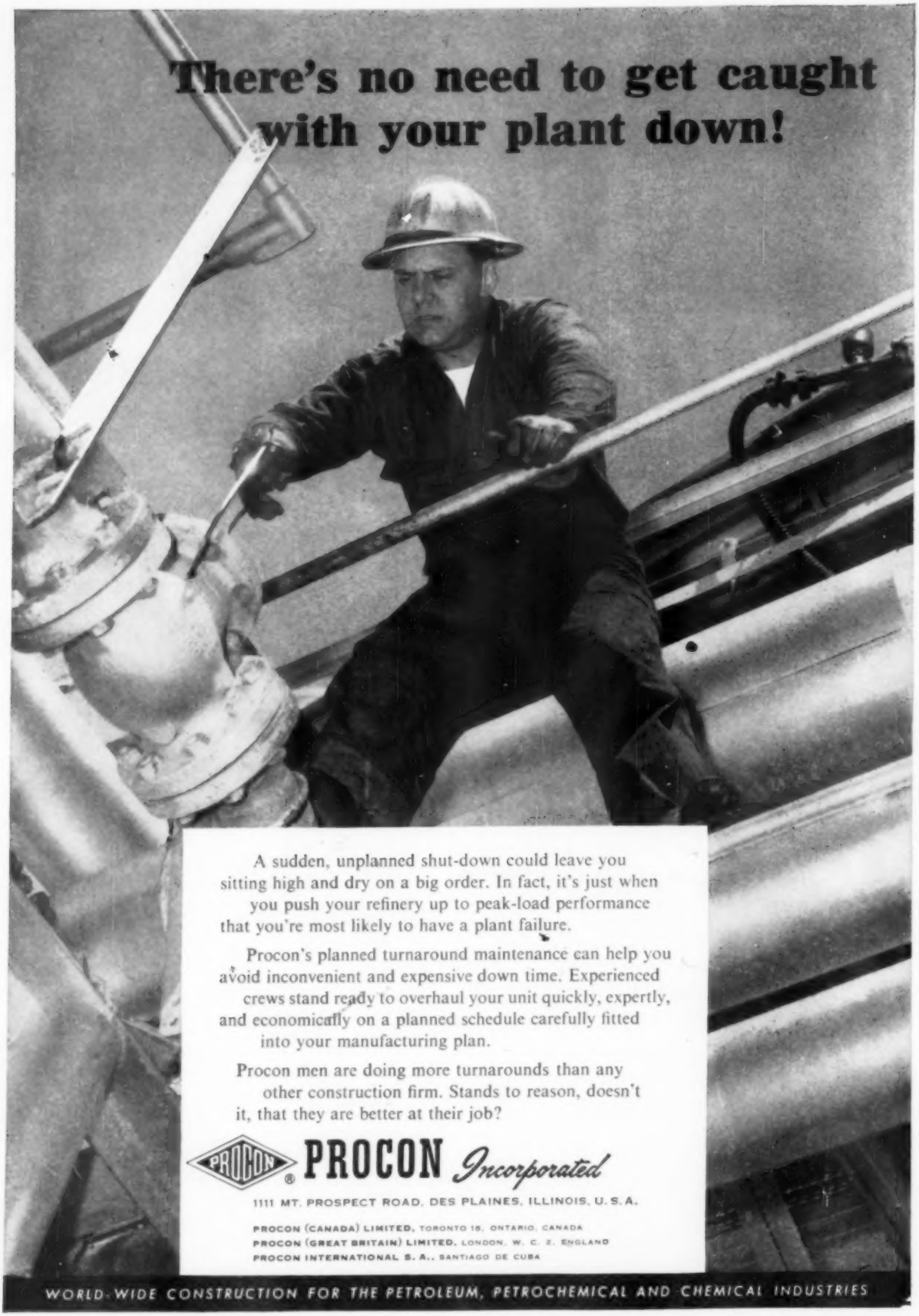
The efficient recovery of raw gasoline from gas streams of 5-50 million cu. ft. per day volume is now provided through a new, completely automatic, skid-mounted adsorption unit developed by Delta.

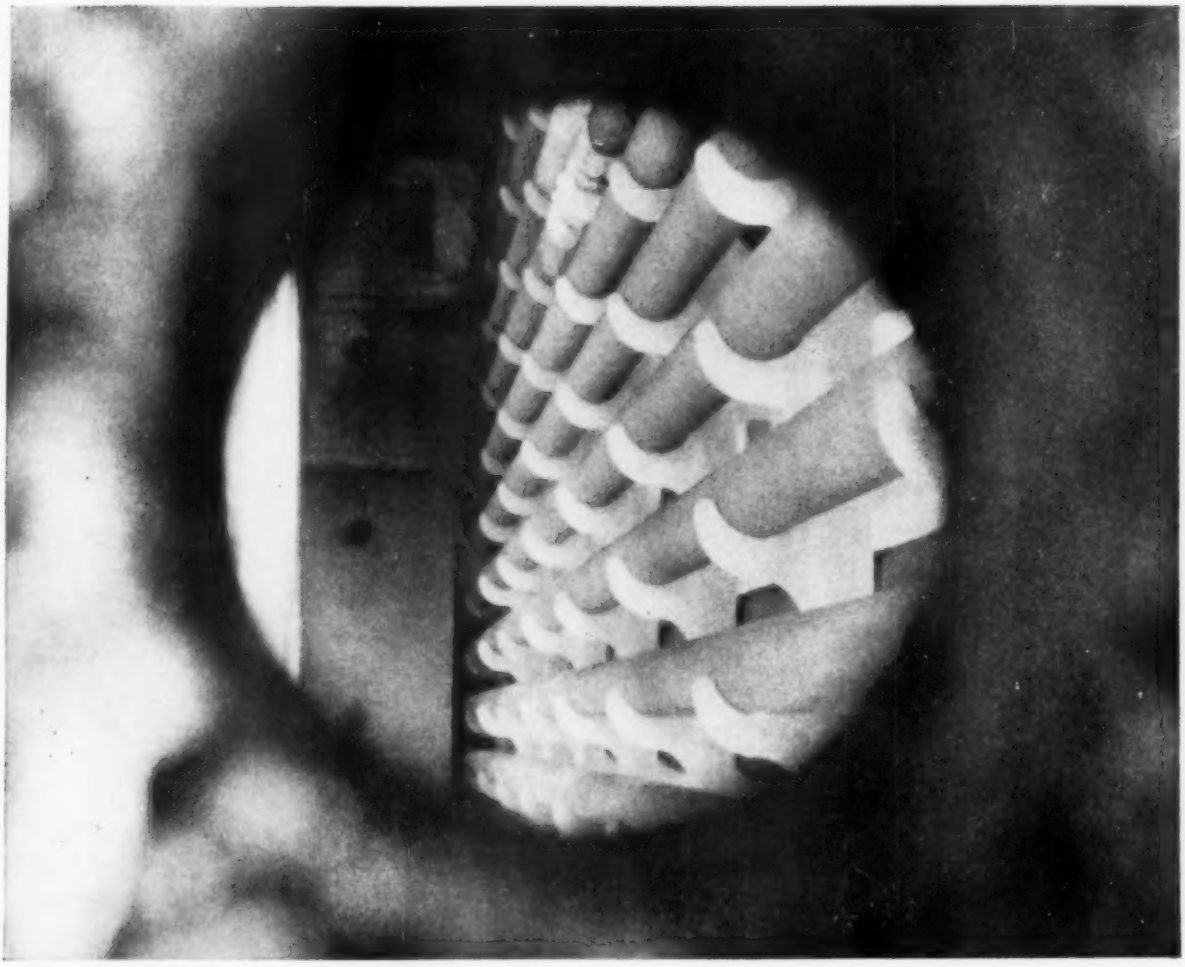
Named "Dryex", this unit affords safe, reliable recovery of 85% of the commercially valuable liquids in such gas streams, at an average operating cost of about 15¢ per barrel. "Dryex" may also be used profitably on large, rich gas flows.



For full information regarding "Dryex" and other units in Delta's advanced line of oil field equipment and fabrication of pressure vessels for the chemical, petro-chemical and petroleum industries, *ask the Delta man.*

DELTA TANK MANUFACTURING COMPANY, INC.
BATON ROUGE, LOUISIANA
PLANTS: BATON ROUGE, LA. • MACON, GA. • BEARDSTOWN, ILL.
EXPORT OFFICE: INTERNATIONAL TRADE MART, NEW ORLEANS, LOUISIANA
FABRICATORS OF OIL FIELD EQUIPMENT, MATERIAL HANDLING EQUIPMENT, AND PRESSURE VESSELS.


There's no need to get caught with your plant down!
A sudden, unplanned shut-down could leave you sitting high and dry on a big order. In fact, it's just when you push your refinery up to peak-load performance that you're most likely to have a plant failure.
Procon's planned turnaround maintenance can help you avoid inconvenient and expensive down time. Experienced crews stand ready to overhaul your unit quickly, expertly, and economically on a planned schedule carefully fitted into your manufacturing plan.
Procon men are doing more turnarounds than any other construction firm. Stands to reason, doesn't it, that they are better at their job?
PROCON Incorporated
1111 MT. PROSPECT ROAD, DES PLAINES, ILLINOIS, U. S. A.
PROCON (CANADA) LIMITED, TORONTO 18, ONTARIO, CANADA
PROCON (GREAT BRITAIN) LIMITED, LONDON, W. C. 2, ENGLAND
PROCON INTERNATIONAL S. A., SANTIAGO DE CUBA
WORLD-WIDE CONSTRUCTION FOR THE PETROLEUM, PETROCHEMICAL AND CHEMICAL INDUSTRIES



A peep inside shows...

Why Gulf puts Incoloy alloy tubes in hottest zone of heaters

The condition of these extruded Incoloy* nickel-chromium-iron alloy tubes speaks volumes.

No cracks. No warps. No thick scale. These tubes have seen thousands of hours of service in cracking hydrocarbons to produce ethylene at Gulf Oil Corporation's million-pound-per-day capacity Port Arthur plant. At this same plant their performance has been duplicated many times over.

After 9000 hours service from Incoloy alloy tubes in one group of furnaces, for example, Gulf stated: "Maintenance has been very slight ... mainly replacing one or two feet at the outlet end of several tubes" (an easy repair with weldable Incoloy alloy.)

One thing that makes Incoloy alloy so reliable in this service is the stability of its austenitic structure. Another is its high resistance to carburization ... a safety factor during decoking.

Gulf also realizes a distinct price advantage in using Incoloy alloy tubing in the relatively inexpensive extruded form.

*Registered trademark

Booklet briefs Incoloy data

Information on the composition, properties, fabrication and heat treatment of Incoloy alloy have been briefed for you in the Inco booklet, "Properties of Incoloy." Let us know if you would like a copy ... or if Inco's Development and Research Division can be of service.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO

Incoloy... *for heat-resistance*

DISCOVER DAVIS

THE EQUIPMENT THAT LEADS THE WAY

THE BACKHOE-LOADER THAT CAN DO MORE THAN A ROUSTABOUT

. . . INCLUDING FLUSH DIGGING

It'll pay you to have a **Davis Backhoe-Loader** on the drilling site, at the refinery and on the pipelaying project.

This versatile equipment will surprise you with what it can do because it does things that larger and more expensive equipment can't.

The **Model 210 Davis Backhoe** can dig flush alongside fences, walls, buildings. It's the only equipment—outside of a man with a shovel—that can do this. It has up to 10,000 pounds of breakaway, and will dig through asphalt and frozen ground.

The operator—sitting on a large, comfortable seat which revolves with the boom—can see exactly where he's digging all the time. That's important when you're excavating around flow or gathering lines.

The **Davis Loader** with its streamlined design gives you unparalleled efficiency on back-filling, land clearing or clean up, and other jobs.

How much does it cost? Less than competitive makes that offer less. **And it's available for your favorite tractor.**

CALL WESTERN UNION OPERATOR 25
for the name of your nearest dealer . . . or write direct for literature. (Please specify make of tractor.)

MASSEY-HARRIS-FERGUSON, INC.
INDUSTRIAL DIVISION
1009 So. West St. Dept. OG Wichita 15, Kansas

Davis Truck-Mounted Back-hoe from the transport to the digging position.

The Model 185 cleaning a ditch at right angles to the tractor.

The streamlined Davis Loader on John Deere 420 Crawler Tractor.

Adomite® gives least fluid loss at bottom hole conditions

Many fracturing additives show desired fluid loss control at surface conditions of low pressure and atmospheric temperature. But at bottom hole conditions, fluid loss becomes so high that effectiveness is lost. Fluid loss control tests demonstrate how effective and profitable Adomite is downhole—in marked contrast with other fluid loss additives.

Compare the deep-down effectiveness of Adomite with other loss control additives

	Fluid Loss at Surface Conditions—100 psi,* 75° F., cc/30 min.	Fluid Loss at Bottom Hole Conditions—1000 psi, 150° F., cc/30 min.
ADOMITE + crude oil	2.2	22.0
Additive X + crude oil	37.8	Infinite
Additive Y + crude oil	8.5	Infinite
Additive Z + crude oil	13.0	295 (1 min., 50 sec.)

*(Standard API Code 29 Test)

Adomite, when mixed with oil, disintegrates into millions of tiny particles. These particles seal the face of the formation and keep the fracturing fluid from filtering in. Temporarily sealing the formation, Adomite particles do not plug it.

Additives X, Y and Z contain small sealing particles, too. As temperatures increase, however, their particles soften or dissolve. Thus, the effect in controlling fluid loss is greatly reduced, especially at high pressures prevalent under bottom hole conditions.

Straight lease crude, gelled crude or refined oil, treated with Adomite, gives effective fluid loss control at bottom hole temperatures and pressures.

Producers who say Adomite . . . stay with Adomite.

© 1957, Continental Oil Co.

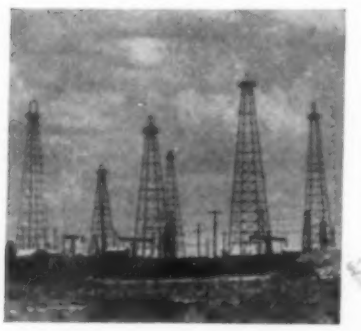
Tell your service company to

fracture with Adomite

BEFORE RODINE was adopted. Note the complete breakdown of the walls of the down-well tubing and casing.

AFTER RODINE was put to use. Though the well is highly acidic, little corrosion of the tubing and casing occurs now.

ACP Rodine® INHIBITS CORROSION IN SWEET WELLS, CONDENSATE WELLS, AND SECONDARY RECOVERY OPERATIONS—COSTS ONLY PENNIES A DAY



For just a few pennies a day you can minimize corrosion that costs you thousands of dollars annually. ACP Rodine will inhibit corrosion, cut maintenance and replacement costs, help prevent loss of production. It is readily soluble in water and brine, is effective over 200°F, can be added to the well by slugging (since it is heavier than the crude, it rapidly sinks into the water layer at the bottom of the well), or by proportioning pumps. And it does not promote or stabilize emulsion.

Specify whether your corrosion problem is in sweet wells, condensate wells, or secondary recovery operations. We'll send technical data and samples. Or our field engineering staff will cooperate with you in corrosion studies, including coupon service and fluid analysis.

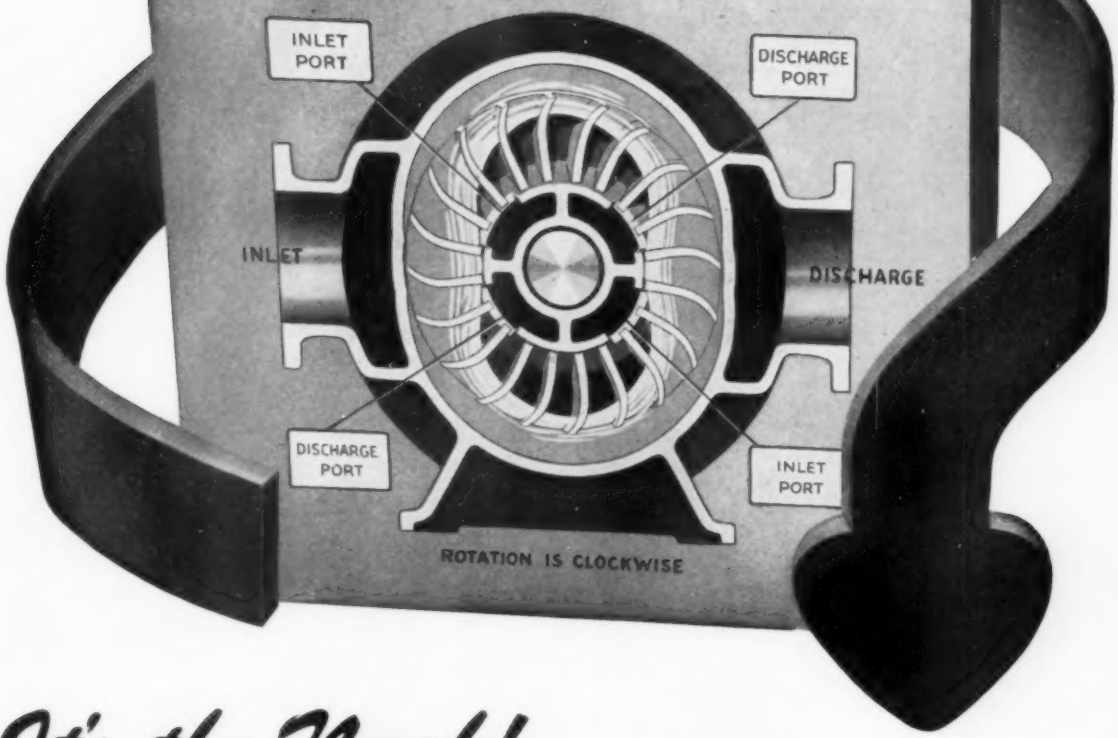
AMERICAN CHEMICAL PAINT COMPANY, Ambler 39, Pa.

CHEMICALS ACP PROCESSES

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

New Chemical Horizons for Industry and Agriculture

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

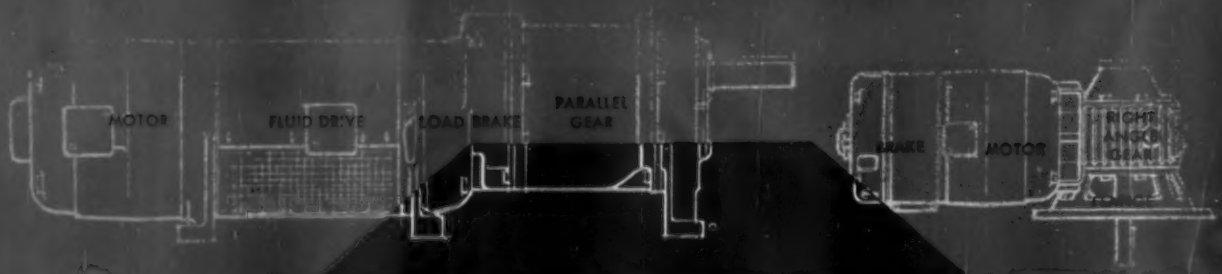
Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

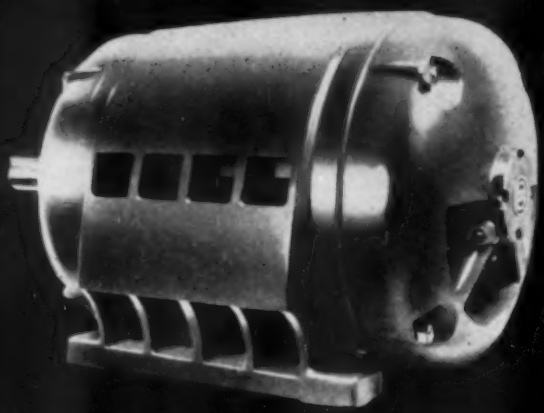
75 pounds in a single stage.

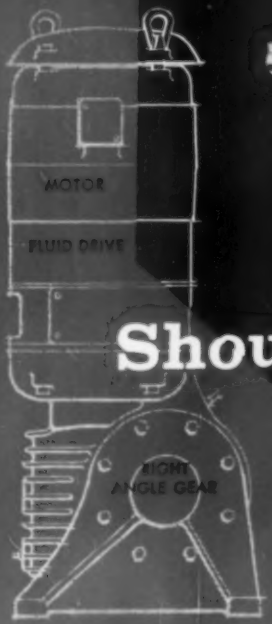
NASH ENGINEERING COMPANY

313 WILSON, SO. NORWALK, CONN.

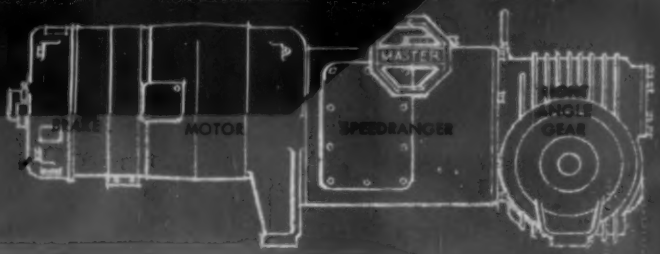


Your specialized drive requirements





Should meet their Master



Master Units Combine into Engineered, Customized Package Drives—Providing the Right Shaft Speed, the Right Construction Features, the Right Mounting. Why Put Up With Makeshift Assemblies?

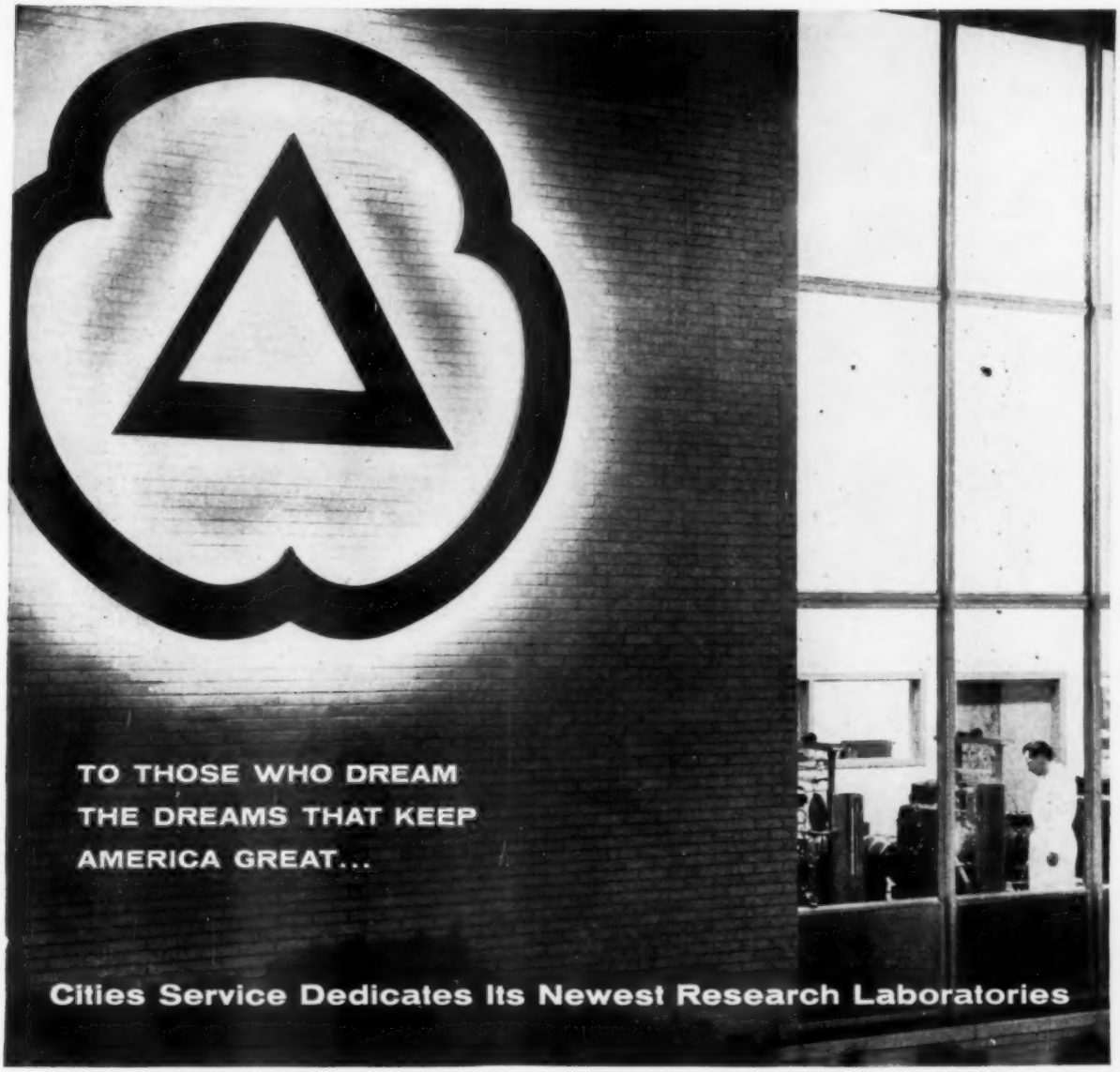
Engineers and Manufacturers of

Electric Motors	**⅛ to 400 H.P.**
Gearmotors	**⅛ to 125 H.P.**
Variable Speed Drives	**⅛ to 30 H.P.**
Unibrake Motors	**⅛ to 150 H.P.**
Fluid Drive Motors	**½ to 15 H.P.**

Alternating current motors, direct current motors, generators . . . open, enclosed, explosion proof . . . with 5 types of gear reducers . . . with electric brakes . . . with mechanical or electronic variable speed units . . . with fluid drives . . . Master has them all and so can be completely impartial in helping to select the one best drive for you.

MASTER ELECTRIC MOTORS

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio



Cities Service believes it is altogether fitting that its splendid new research laboratories at Cranbury, New Jersey be dedicated to those who will use them so wisely and well.

Often unsung, sometimes unappreciated, the men of science in the industrial laboratories of the country are a national resource beyond the command of money.

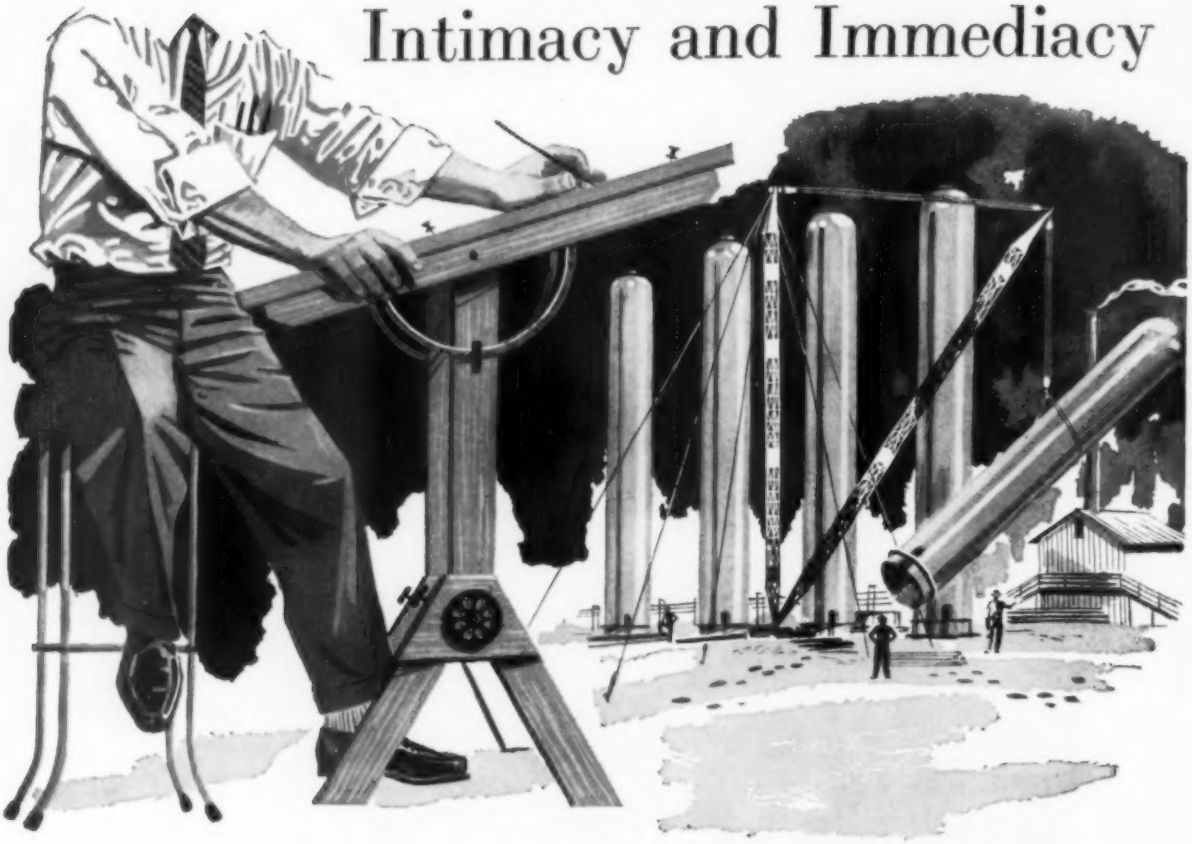
They kindle the fires of imagination and keep them burning. They spark the constant development of new products and the continual improvement of established ones. Because of their dedication to the new and better, management can build, salesmen can sell, every business can grow in usefulness, and the public benefits.

Joining four other great Cities Service laboratories, these newest facilities will provide the most advanced equipment for research in petroleum and allied fields. Included is a modern nuclear section for long-range research in the field of process development, fuels and lubricants—the heart of which is the largest concentration of irradiated cobalt ever to be supplied by the Atomic Energy Commission's Brookhaven National Laboratory.

Cities Service is proud, indeed, of its modern new laboratories and their advanced equipment . . . but takes far greater pride in the men who will man them. It's their dedication and skill that spark our growth and our service . . . for today and for tomorrow.

CITIES SERVICE

Intimacy and Immediacy



YOU GET BOTH IN A PRITCHARD SINGLE RESPONSIBILITY CONTRACT

Two prerequisites to a successful construction project—whether it be for a new plant, modernization or expansion of present petroleum and gas facilities—are an intimate knowledge of the project, and the ability to hasten its completion.

With a Pritchard Single Responsibility Contract you are working with only one firm. Complete responsibility for everything is solely with Pritchard. Since no other prime contractors are involved, Pritchard is intimately familiar with what is going on and can accurately report progress to you. Designers work closely with engineers; engineers coordinate drawings with actual construction, and purchasing is done on a precise time schedule.

How about immediacy? From the moment you sign your Pritchard Single Responsibility Contract there is a steady flow of activity. No time is lost. Preliminary construction begins even before final engineering drawings are completed. Materials arrive on the job site to coincide with strict timetables. The result? Your project is completed faster, your new plant is in operation producing income sooner and you can free invested capital faster for other uses.

Before you go any further with your new plant or plant expansion, investigate all the advantages that are yours with a Pritchard Single Responsibility Contract.

YOUR INQUIRY IS INVITED

SERVING THE GAS, PETROLEUM, CHEMICAL, PETROCHEMICAL, PULP, AND PAPER INDUSTRIES AND THE POWER PLANT NEEDS OF INDUSTRY AND CORPORATE UTILITIES.

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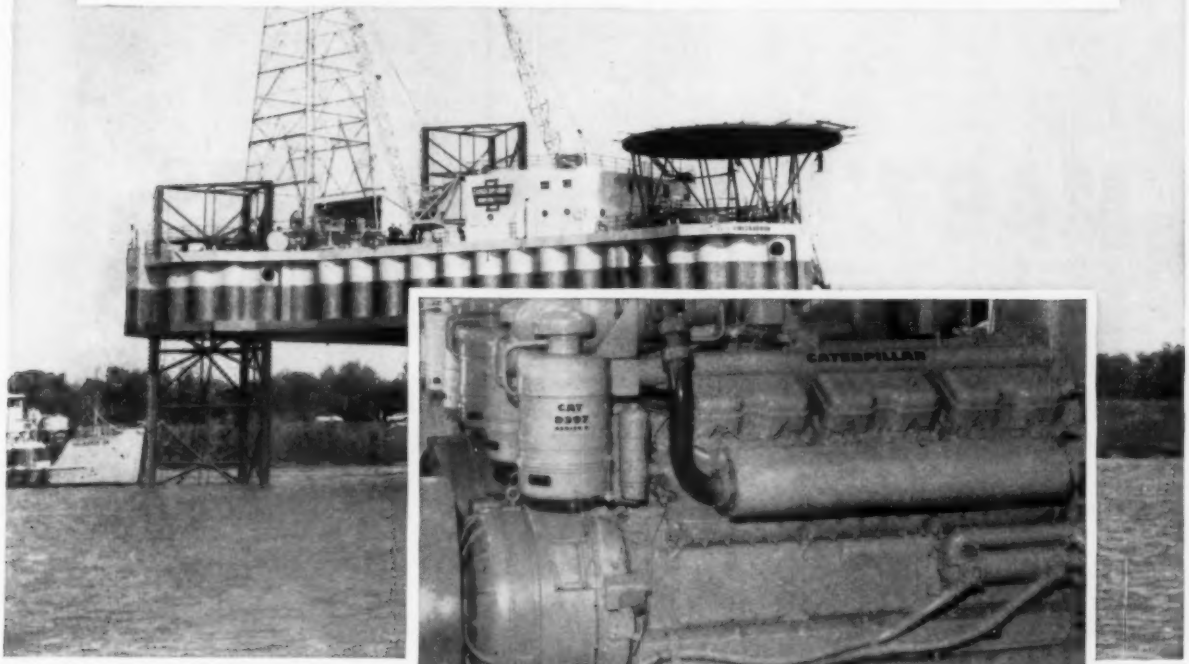
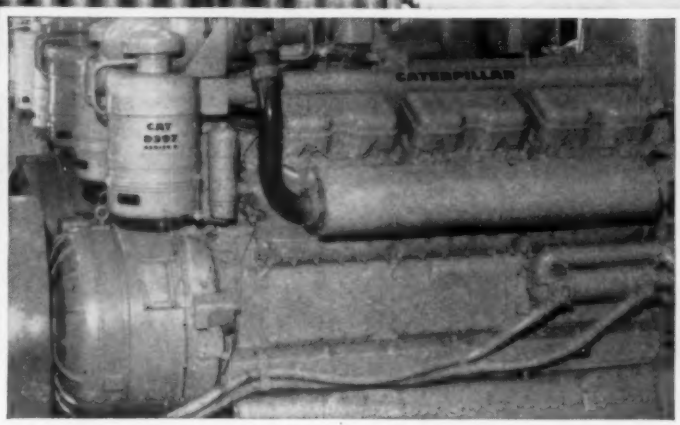
MANUFACTURERS
OF COOLING TOWERS AND GAS AND
AIR TREATING EQUIPMENT

Here's how Zapata puts torque to work on new off-shore rig...



Over-all view of Zapata Off-Shore Company's new drilling rig, the *Vinegarroon*.



Close-up of one of the four Twin Disc 16,000 Series Three-Stage Torque Converters which transmit power from four Caterpillar D397 Engines to the drawworks, rotary table and mud pumps on the *Vinegarroon*.

ZAPATA OFF-SHORE COMPANY'S new *Vinegarroon* is truly a modern, heavy-duty drilling rig in every sense . . . from its adjustable tripod legs to its helicopter landing field.

Built by R. G. LeTourneau, Inc., it carries a 140-ft. derrick, an Oilwell Model 96 Drawworks and four 575-hp Caterpillar D397 turbo-charged Diesel Engines equipped with Twin Disc Three-Stage Torque Converters. Two of its three mud pumps alone are rated each at 925 input horsepower at 65 revolutions per minute.

The Twin Disc Torque Converters in this installation are compounded to transmit power to the mud pumps, drawworks and rotary table. As mud pump pressures increase, the Twin Disc Torque Converters instantaneously multiply engine input torque to meet the increased requirements. It's the same with the drawworks, where the load varies continually as the hole deepens, and with the rotary table, when tough material is encountered.

Twin Disc Torque Converters offer many other profitable advantages, too. They cushion out destructive shocks and vibrations between engines and driven equipment . . . they prevent engine stalling . . . they permit engines to produce maximum output whenever required, regardless of load . . . and they get more work done wherever varying loads are encountered.

Be sure to specify Twin Disc Torque Converters, three-stage or single-stage, on your next oil field equipment. They are available from all leading oil field equipment and machinery manufacturers.

Twin Disc Clutch Company, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois . . . with parts and service throughout most of the world.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Torque Converters

SAVE 2 WAYS WITH

MARTIN RUBBER GUIDE CAGES

1. GREATER PRODUCING PROFITS *because:*

Martin Cages last much longer. The oil-proof rubber guides do the trick, by absorbing the ball peen hammer action of the hard balls. They also have superior resistance to sand abrasion. And they can be replaced.

2. GREATER PRODUCING PROFITS *because:*

Ball & Seat life is usually doubled, on the average. With the rubber guides, there is much less chattering, chipping and pitting. Ball falls true on seat. Such improvement in Ball & Seat life eliminates a lot of pulling expense.

In the last year alone, new users of Martin Cages have increased by 85%. The word is getting around. More and more economy-minded producers are learning about the advantages of the Martin Cages! . . . Manufactured in open and closed types . . . all diameters and styles. Write for John Martin Catalog No. 4 today. *Martin Cages are available through all supply stores.*

JOHN N. MARTIN

Manufacturer

9 W. BRADY • TULSA, OKLA.

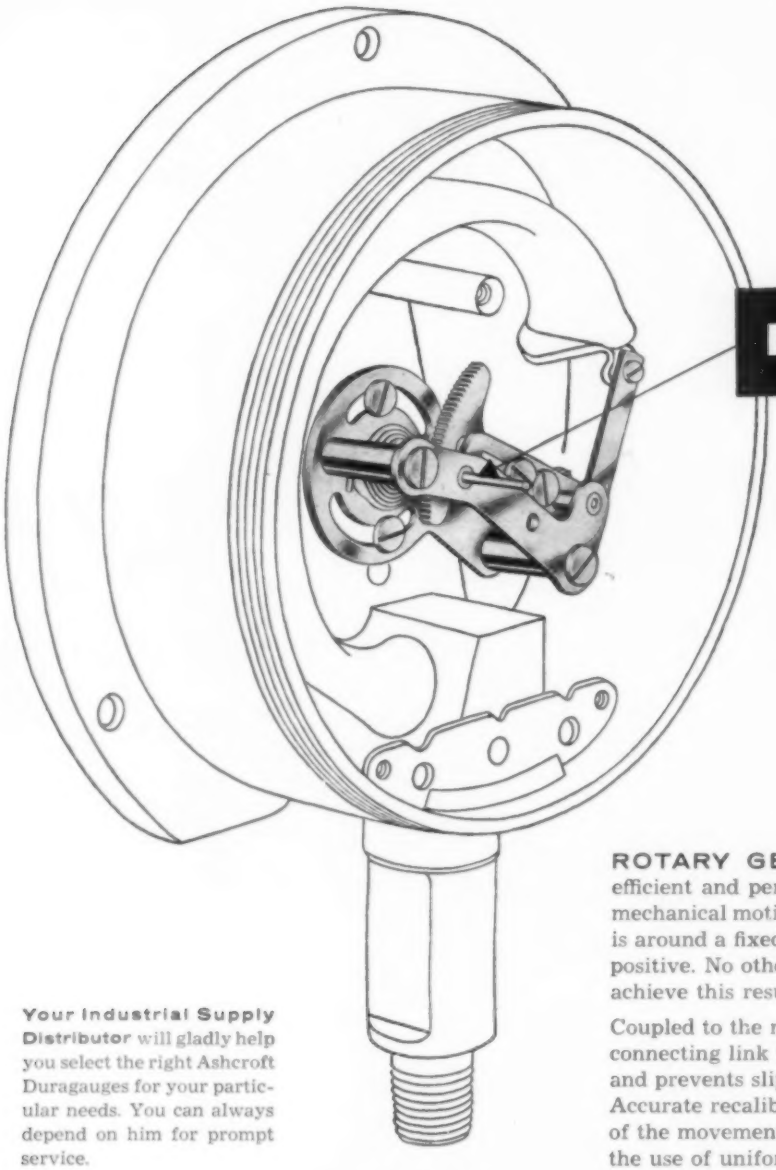
you'll find
CF&I SEAMLESS CASING AND TUBING
throughout the Wyoming basins

Today, CF&I Seamless Oil Country Casing and Tubing is serving operators throughout Wyoming's Big Horn, Green River, Laramie-Hanna, Powder River and Wind River Basins—just as it is serving other oil field operators all over the West.

Why such popularity? The answer is *quality*—quality that assures each operator that CF&I's conveniently located Seamless Tube Mill offers them casing and tubing manufactured for maximum service.

It will pay you to specify *CF&I* Seamless Oil Country Casing and Tubing. Available in 2⅜" through 9⅝" O.D., this dependable product meets or exceeds API STD 5A specification. See your CF&I representative today for complete details.

4478



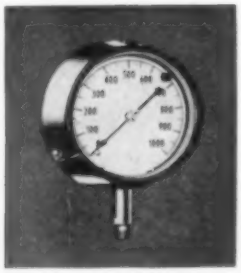
Why does the MOVEMENT in the ASHCROFT DURAGAUGE outperform all other types?

ROTARY GEARED MOTION, the most efficient and perfect method of transmitting mechanical motion ever developed. Because rotation is around a fixed center, pointer position is always positive. No other type of movement can ever achieve this result.

Coupled to the movement is a one-piece connecting link that guarantees correct calibration and prevents slippage or parting under tension. Accurate recalibration is easy from front or rear of the movement. Universal adjustability permits the use of uniformly graduated dials, thereby facilitating maintenance.

The Ashcroft Duragauge is available with all-stainless-steel movement or stainless steel with nylon bearings and pinion gear. There are case designs and materials, Bourdon tube materials, pressure ranges and dial sizes to meet your service conditions exactly. Save time, trouble and money. Specify the pressure gauges of highest sustained accuracy and durability – Ashcroft Duragauges.

Your Industrial Supply Distributor will gladly help you select the right Ashcroft Duragauges for your particular needs. You can always depend on him for prompt service.



In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

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A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

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The Rockwood Dualsteel Union was made especially to handle highly corrosive material

There's nothing to worry about

It's a ROCKWOOD DUALSTEEL UNION!

Rockwood's Dualsteel Unions stand up to wrench abuse and overcome galling. The reason — Dualsteel's greater Brinell hardness.

Rockwood Dualsteel Unions are made of a new special alloy steel. This special alloy steel cannot be welded, it's tougher, more resistant to corrosion. Straight waterway eliminates corrosion and erosion at seat joint. You get greater strength without bulk!

The entire union is completely "Rockwoodized", the threads being protected by "Rockwoodizing" after having been machined. This process plus the special alloy make the Dualsteel Union ideal for the handling of corrosive material.

But there are even more reasons why Rockwood Dualsteel Unions are what you're looking for. All Dualsteel Unions are individually air tested under fluid. Their ultimate strength is 85,000 pounds per square inch.

If you want a union that will resist corrosion and overcome galling . . . a union that has more advantages — and none of the weakness of solid steel constructed unions — you want Rockwood's Dualsteel Unions.

For complete information fill in the coupon below. We'll send all the data.

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Please send me prices and further data on the Rockwood Dualsteel Unions.

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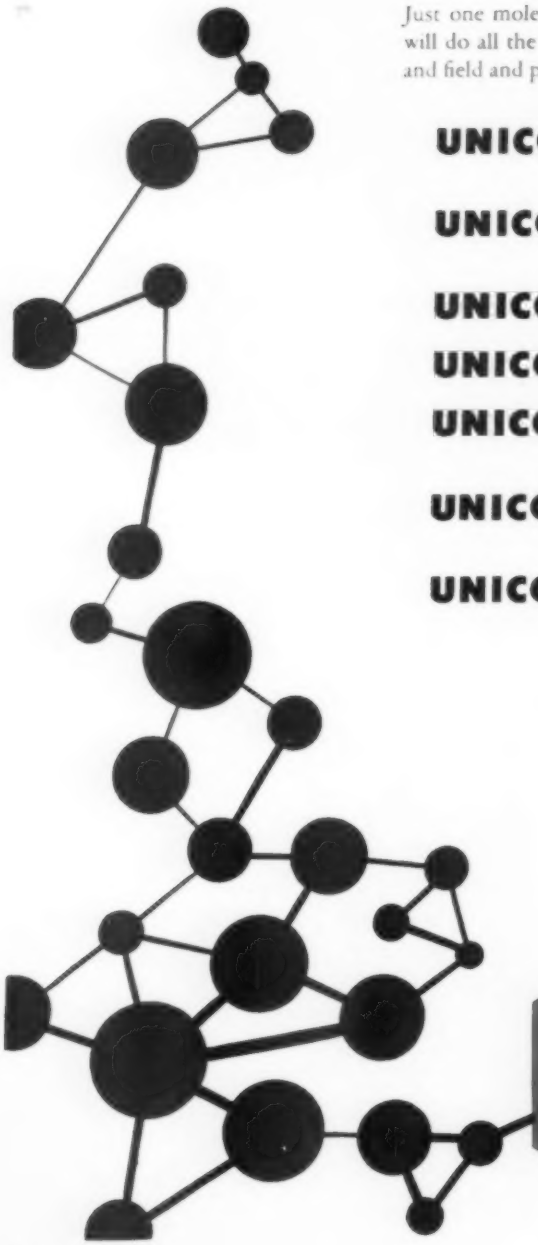

Just one molecule of Unicor to one million molecules of pipeline product will do all the things listed below. Unicor has been tested in both laboratory and field and proved to be superior to any other form of corrosion preventive.

UNICOR® prevents both aerobic and anerobic corrosion. Your tanks, vessels and pipelines are protected whether full, half-full or empty.

UNICOR is oil soluble and eliminates need for addition of destructive water. It prevents rusting caused by unavoidably entrained or dissolved moisture.

UNICOR is slime-detergent and anti-fouling. The water-repellent film it forms on pipe interiors sheds corrosive droplets.

UNICOR cuts downtime to a minimum, reduces filter replacement and the use of scrapers by at least one-half.

UNICOR will not interfere with action of other useful additives such as tetraethyl lead, antioxidants and dyes. It is approved for use in Air Force and Navy jet plane fuel.

UNICOR is added at only one point. Its beneficial effect will extend to pipelines, storage tanks, tankers . . . even to consumer equipment when added at the refinery.

UNICOR is economical, costing only about $0.001 per bbl. of pipeline product. It has been approved for use in common carrier pipelines.

Sold exclusively by Universal Oil Products Company. For samples and information, write to:

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UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road
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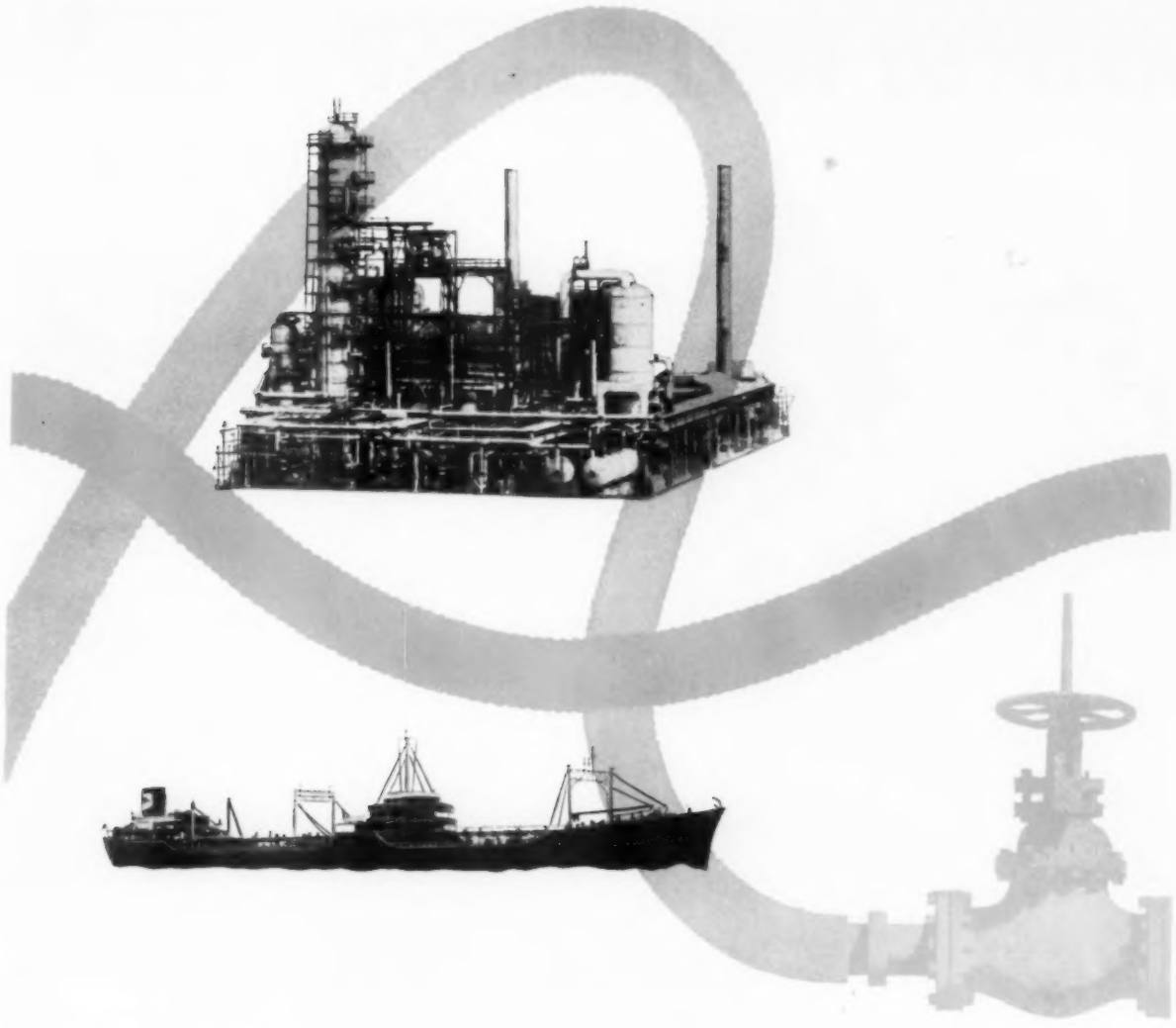

Sun Ship has furnished equipment for many major oil companies in America

Of essential importance to American welfare is the free, expanding progress of the Oil Industry. Tankers for many of the oil companies have been built in the Sun Ship Yard. Also, refining equipment repairs and replacements have been furnished for the major oil companies.

In addition, Sun builds special machinery and fabricated steel products for a variety of other industries whose problems have been a welcome challenge—readily accepted—easily solved. Call or write our Sales Engineering Department about your plans—or problems. Immediate, courteous attention is assured.

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SHIPBUILDING & DRY DOCK COMPANY

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HIGHEST WELL PRESSURE EVER!

—Certified by MARSH

Yes, 11,400 psi!

This was oil country drama at its best: bringing in the "2 Elue Roach" well in Union Oil & Gas Corporation's spectacular Lake Arthur Field at Jefferson Davis Parrish, Louisiana. The Marsh Gauge climbed to 11,400 psi; later reached 11,600 psi—highest shut-in tubing head pressure ever registered by an oil well, and by a good margin.

Only a few years ago oil companies were refusing to complete wells that threatened pressures of even 10,000 psi. But stronger casings, and techniques developed by Union in dealing with ever higher pressures in the Lake Arthur Field, had made "2 Elue Roach" a producing reality.

It took a lot of doing—a lot of programing and qualifying of materials—to bring in the Roach Well and the new era it foretells. So it is not surprising to see a Marsh Gauge at the top of the Christmas Tree.

Yes, wherever oil flows Marsh is at the top of the list. In the Mastergauge everything that can contribute to gauge accuracy and dependability has been brought to a higher stage of development:

—One-piece leak-proof construction of socket, tube and tip by the exclusive Marsh "Conoweld" process.
—Sturdy "Marshalloy" case of boiler-plate thickness steel; copper clad inside and out.
—Precision movement with unduplicated plus features like the "coined" sector gear.
—Stainless tubes and sockets available for any corrosive service.
—Finally, the famous Marsh "Recalibrator" to keep the gauge always accurate.

Ask for new catalog covering Marsh instruments.

An interesting account of the method of completing the "2 Elue Roach" will be found in the February 11 issue of Oil & Gas Journal. Depth of well is 15,461 ft. Well tested 190 bbl. of condensate and 6,375,000 cu. ft. of gas daily.

MARSH INSTRUMENT CO. *Sales Affiliate of Jas. P. Marsh Corp.* **Dept. L, Skokie, Ill.**
Marsh Instrument and Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alberta
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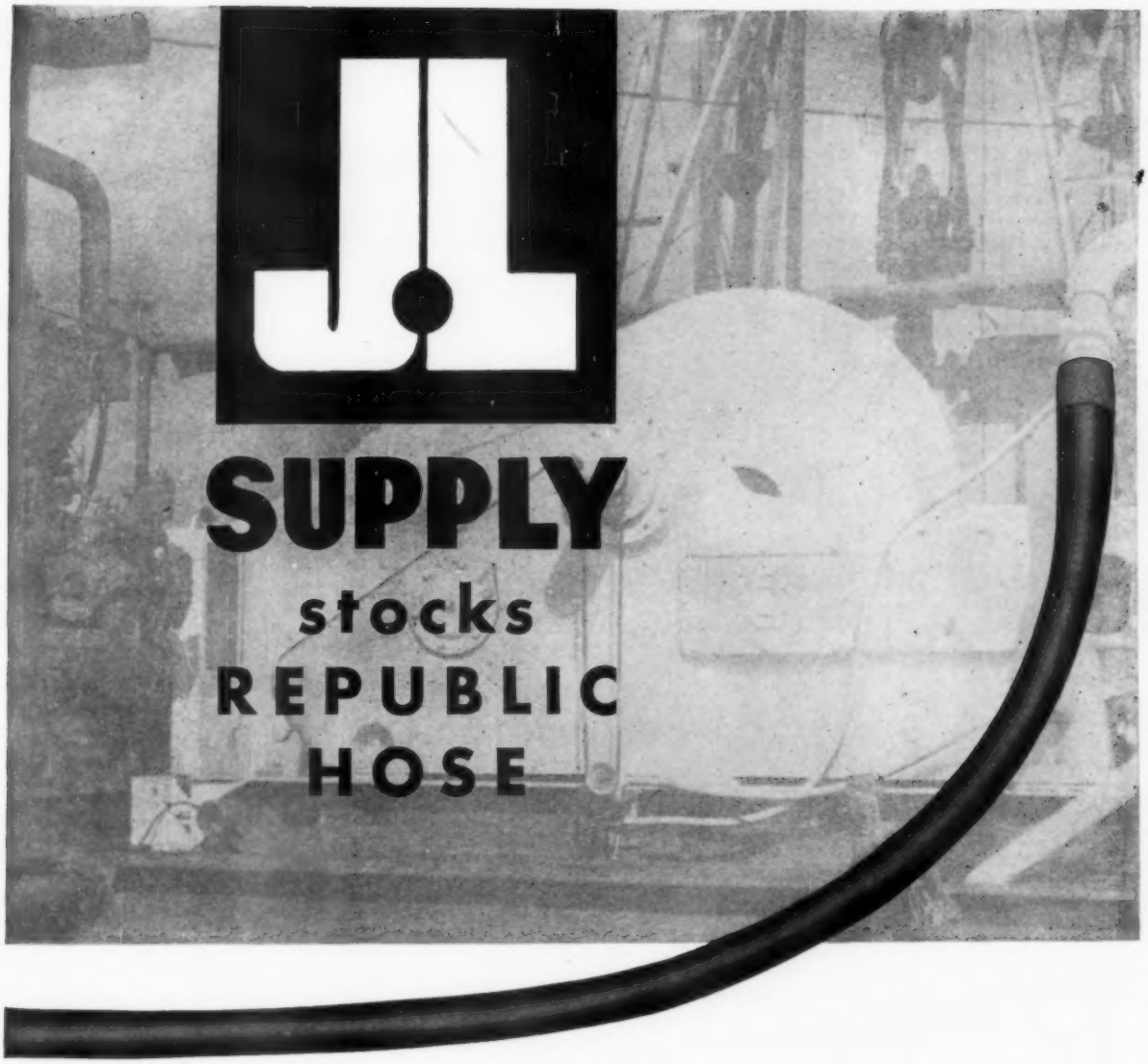

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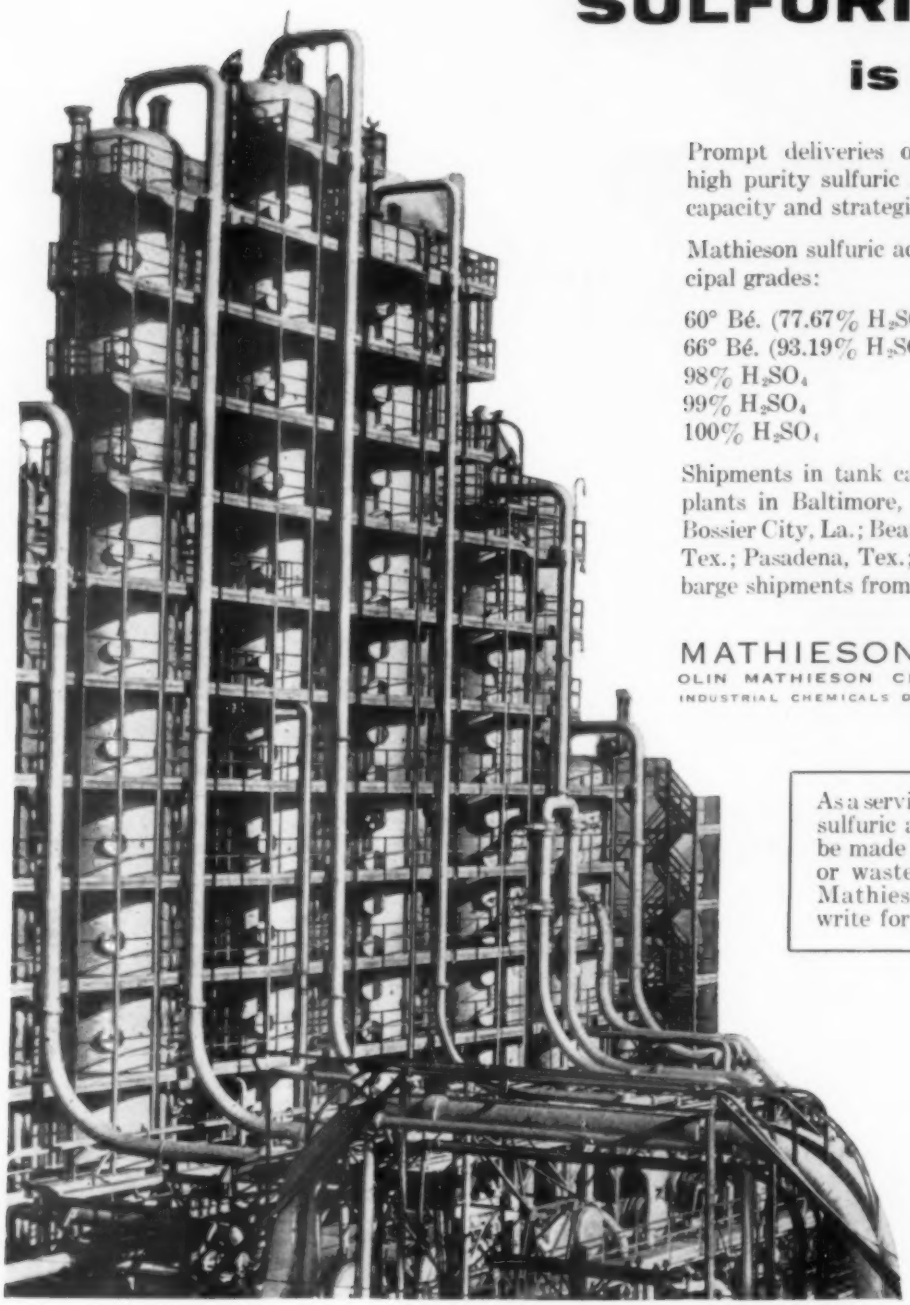

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SULFURIC ACID
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Prompt deliveries of Mathieson's uniformly high purity sulfuric acid are assured by large capacity and strategic plant locations.

Mathieson sulfuric acid is available in all principal grades:

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Shipments in tank cars and tank trucks from plants in Baltimore, Md.; Little Rock, Ark.; Bossier City, La.; Beaumont, Tex.; Port Arthur, Tex.; Pasadena, Tex.; and Palmerton, Pa. Also barge shipments from Baltimore.

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As a service to users of Mathieson sulfuric acid, arrangements can be made for the return of spent or waste acid. See your Olin Mathieson representative or write for information.

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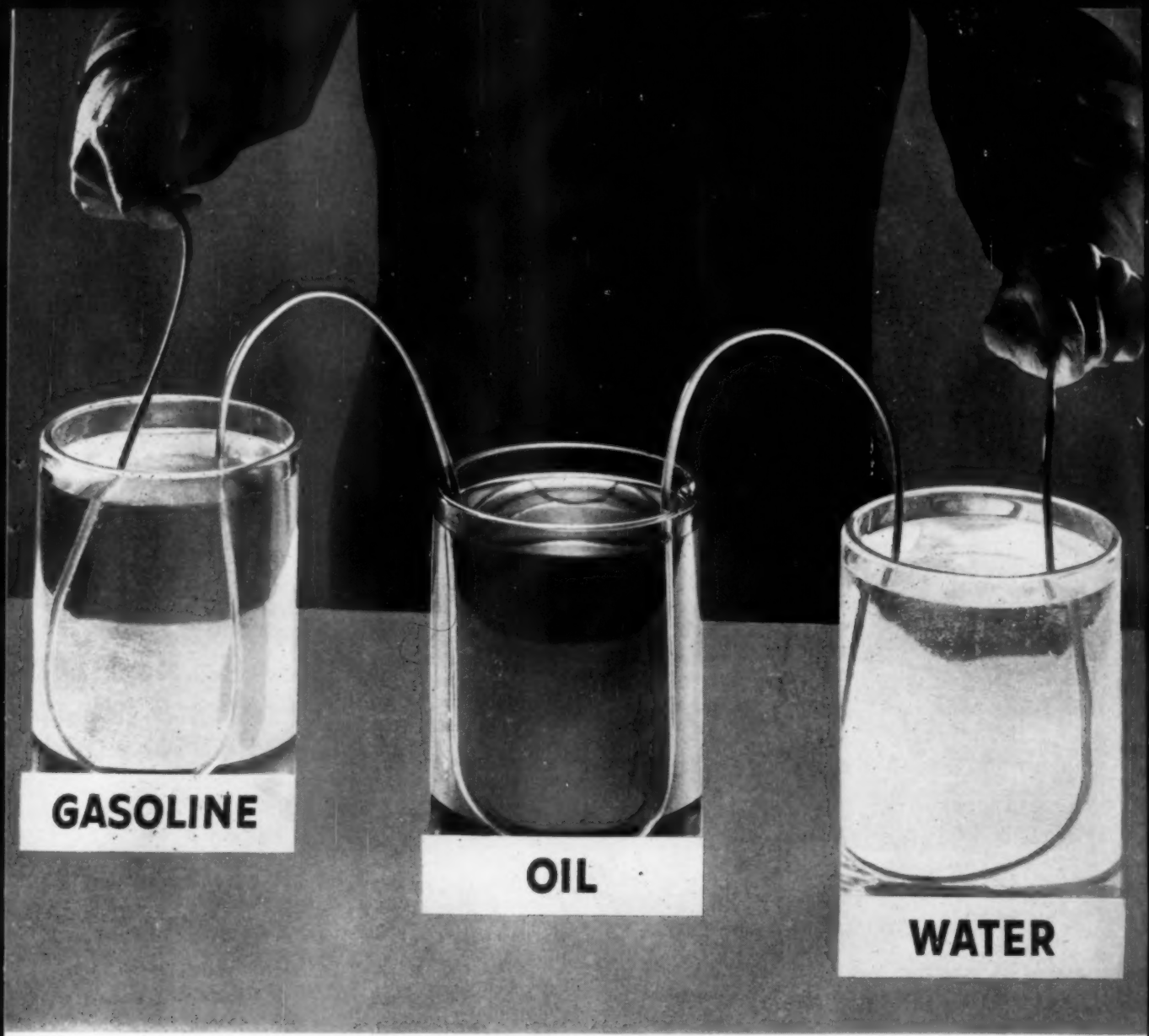

DENTROL WIRE—submerged in gasoline, oil, water—proves resistant to all 3.

Dentrol, only type of thermoplastic wire that RESISTS ALL 3—GASOLINE, OIL, WATER!

Dentrol wire affords *new safety* wherever wiring is exposed to gasoline or oil—*new economy* over the lead-covered cable you're now using in these areas.

Made with a clear nylon jacket over-all, Dentrol not only beats gasoline, oil and moisture—but is exceptionally resistant to abrasion. It is easily installed (hard, smooth finish makes pulling through conduit simple), easily stripped, lightweight for easy handling.

Suggested uses: for 600 volt wiring for lighting, power and control in and around service stations, refineries, tank farms, and industrial plants.

Dentrol is Underwriters' Laboratories approved as TW and "gasoline-resistant" wire for use in open raceways where exposed to gasoline or gasoline vapors. Thus it meets the provisions of section 5023 of the 1956 National Electrical Code, concerned with installations in hazardous locations.

Available in colors, and in 500′ cartons. See your Anaconda distributor. For information write: Anaconda Wire & Cable Company, 25 Broadway, N. Y. 4, N. Y. 57294

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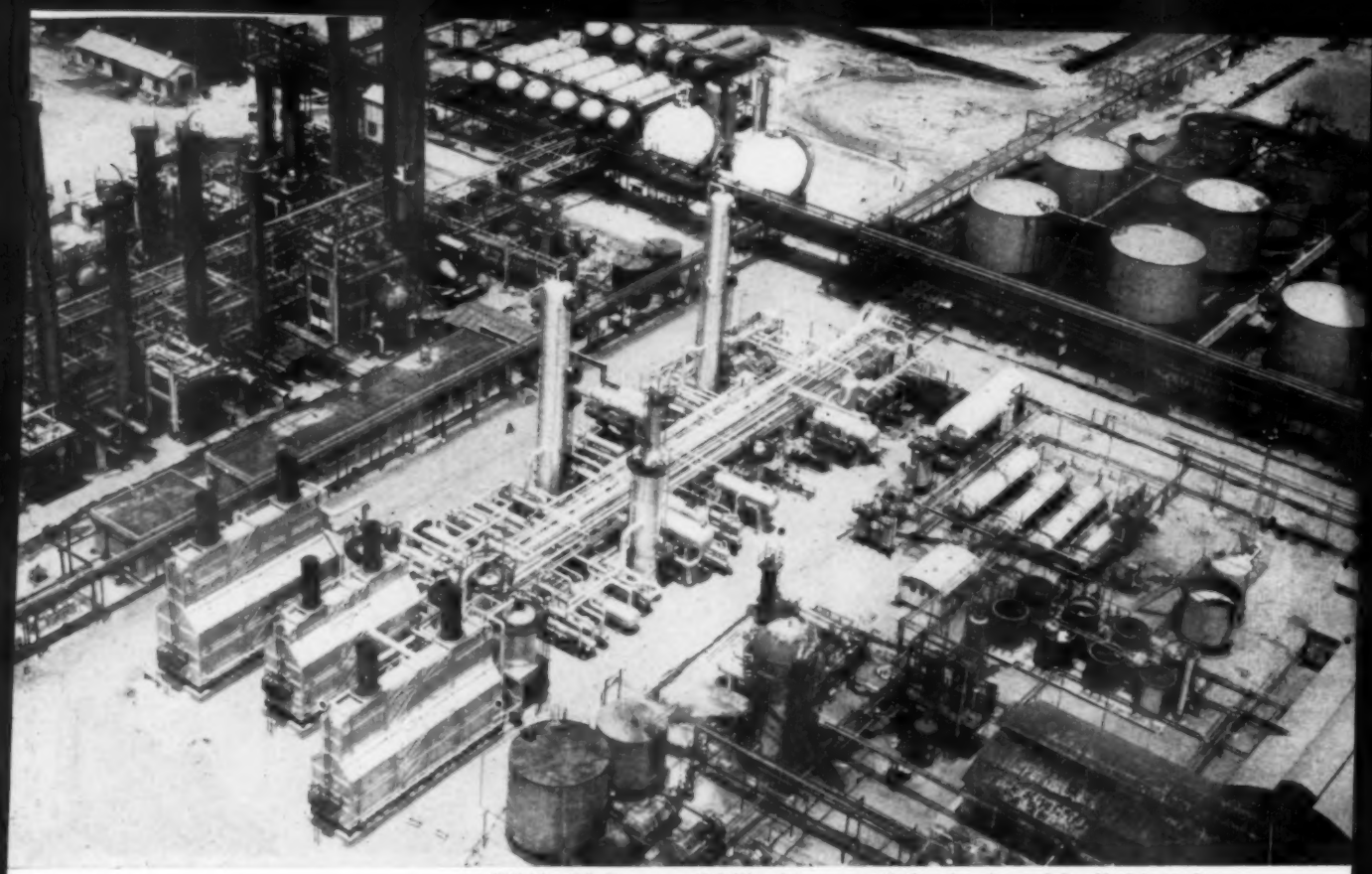

Wilshire Oil Company of California's new catalytic reforming and desulfurizing units at Norwalk, designed and constructed by SWECO to produce high-octane motor fuel.

Teamed to Upgrade Lowgrade

Working together, Wilshire Oil Co. of California and SWECO have been solving process problems since 1923. They've done it again with this new 10,000 BPD Platformer-Unifiner for premium-quality gasoline.

To help satisfy the growing thirst of modern auto engines for higher octane fuels, Wilshire Oil Co. of California decided to add a new catalytic reforming unit at its Norwalk plant. Design and construction were placed in the hands of SWECO's Engineering and Construction Division. A logical choice. The two companies have been working together since 1923, when SWECO built an absorption plant for Wilshire at Santa Fe Springs. And for 34 years, SWECO had been supplying Wilshire with heat exchangers and other process equipment. SWECO was a known *dependable* quantity.

High temperature, high pressure

The Norwalk project was a 10,000 BPD Platformer-Unifiner to upgrade low-octane naphthas. Temperature and pressure requirements were high: The Platformer – using platinum as a catalyst to reform the molecular structure of hydrocarbons–required 975°F., 650 psig. The Unifiner – freeing sulfur from the naphtha to permit high-severity reforming – required 675°F., 850 psig. To meet process requirements, SWECO supplied 13 heat exchangers, designed and manufactured at its Los Angeles plant.

Signed, sealed and "on stream"

Approximately 13 months after SWECO engineers went to work, the Norwalk unit went "on stream." (Total elapsed time included 7 months of field construction.) It's a typical SWECO job. Done right, and done right on time, whether it's in Tanganyika, the Andes, or around the corner in Norwalk, California.

Typical also of SWECO teamwork on all jobs . . . in *engineering and construction* of refineries, chemical plants and ore beneficiating mills . . . in the design and manufacture of *process equipment* . . . in a complete line of *vibrating screen separators* . . . or *extended service* in plant mcdernization; procurement and expediting; plant operation.

For more information on how SWECO teamwork may help your engineering and construction needs, write for Brochure E-5-317.

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Southwestern Engineering Company

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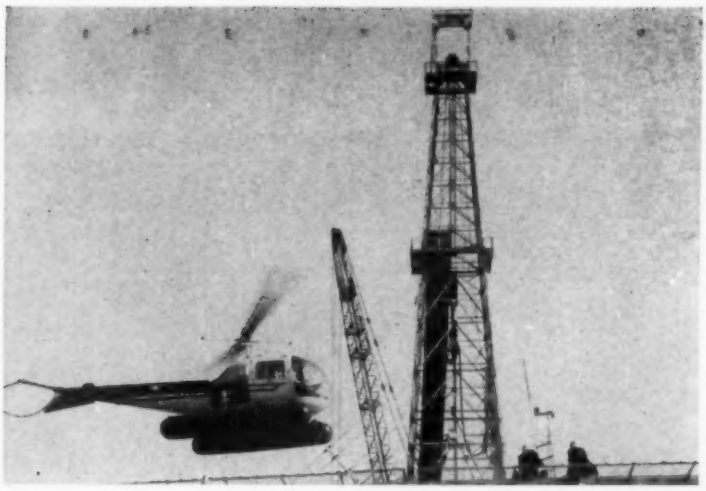
Engineers and Constructors . . . Manufacturers

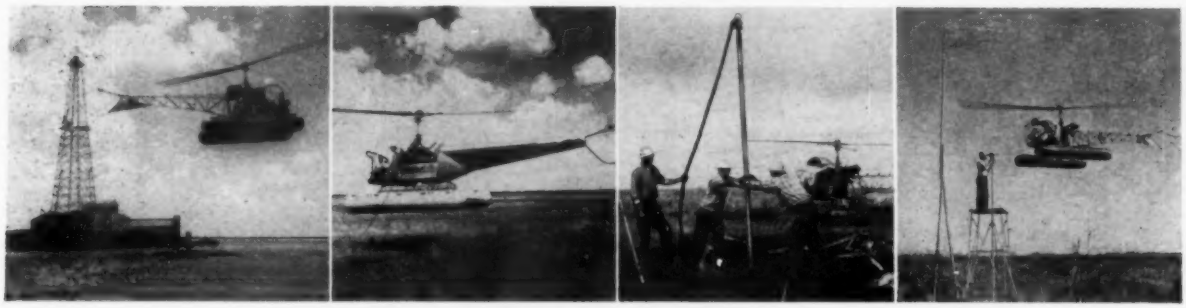


Today, the

BELL

helicopter . . .

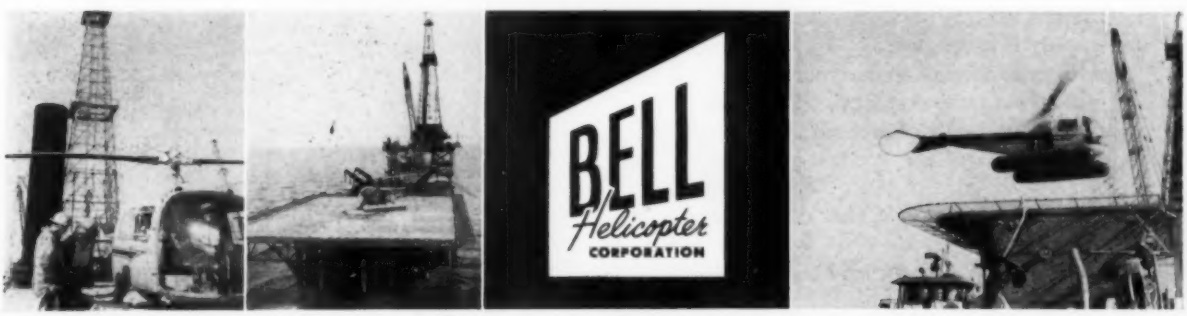
essential to the oil industry as the derrick itself



• In survey and exploration . . . in drilling and offshore work . . . in production and pipe line operations . . . Bell has pioneered in every phase of the oil industry since 1946.

There never was a better time than *now* for you to try the Bell helicopter. The test years of this most versatile of aircraft are behind you. More than thirty of America's best-known companies have spent upwards of fifteen million dollars exploring its uses, proving its worth . . . *and earning a tenfold return on their Bell investment.*

Two easy, low-cost ways to try the Bell in your operation are: (1) Charter Service, (2) Bell's Lease-Purchase Plan. Why not write us today for success stories from Bell users, and for names of Charter Services nearest you. Dept. 20, Bell Helicopter Corporation, Fort Worth, Texas.



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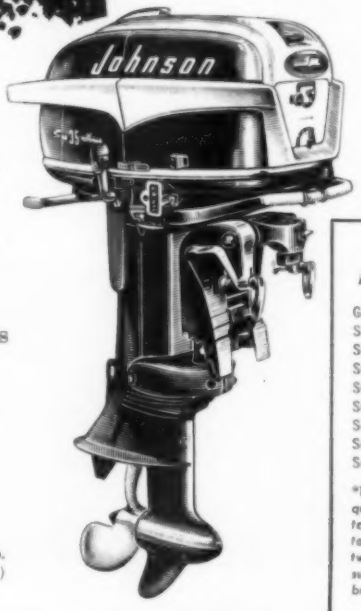
More companies depend on Johnson Sea-Horses than on any other outboard motor



New for '57—"sweetest-running Johnsons ever"

There are two new power classes in our '57 line—with five load-loving Johnsons now delivering 18 or 35 hp. Nine new motors in all, each now equipped with a drive pin saving slip-clutch. And each protected against salt water corrosion, so no flushing is necessary.

Johnson leadership in commercial outboard sales and use stems from one fact . . . Johnson dependability. Hour after hour, year after year, Sea-Horses deliver the goods—at all speeds and under all conditions of load. See your Johnson dealer now. He's listed in the Yellow Pages.

FREE! 1957 Sea-Horse catalog, write: Johnson Motors, 227 Pershing Rd., Waukegan, Ill. (Div. of Outboard Marine Corp. In Canada: manufactured by Johnson Motors, Peterborough, Ont.)

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Golden Javelin*	35 hp.	$625
Sea-Horse 35*	35 hp.	585
Sea-Horse 35	35 hp.	495
Sea-Horse 18*	18 hp.	475
Sea-Horse 18	18 hp.	395
Sea-Horse 10	10 hp.	340
Sea-Horse 7½	7½ hp.	260
Sea-Horse 5½	5½ hp.	230
Sea-Horse 3	3 hp.	155

**12-volt electric starting (new quick-charging 10-ampere generator with automatic voltage regulator available as accessory on first two models). Prices f.o.b. factory, subject to change. OBC certified brake hp at 4000 rpm (18s and 35s at 4500)*

A million Sea-Horse owners will tell you ***JOHNSON KNOWS BEST***

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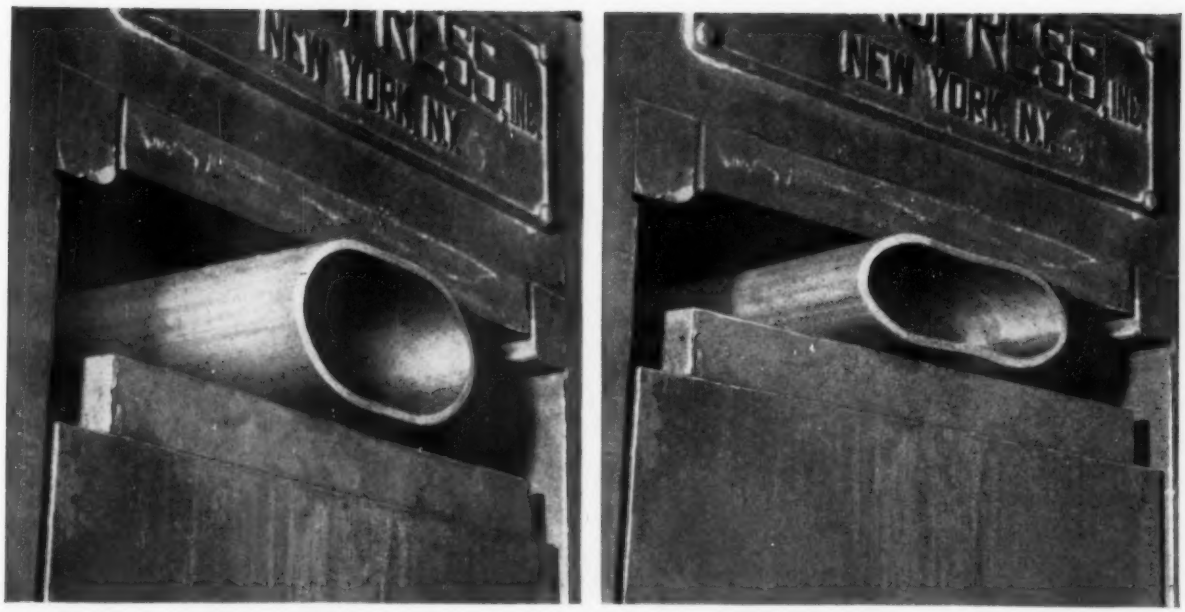

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ONLY the soundest welds, joining an extremely ductile steel, could stand the strain of the pipe-flattening test shown here.

We know, of course, that no electric weld pipe would ever be subjected to such rigorous conditions in the field.

Still, at Kaiser Steel we want to be *sure*.

So—52 times along the way from iron ore to finished pipe—we run exhaustive tests to keep the quality high.

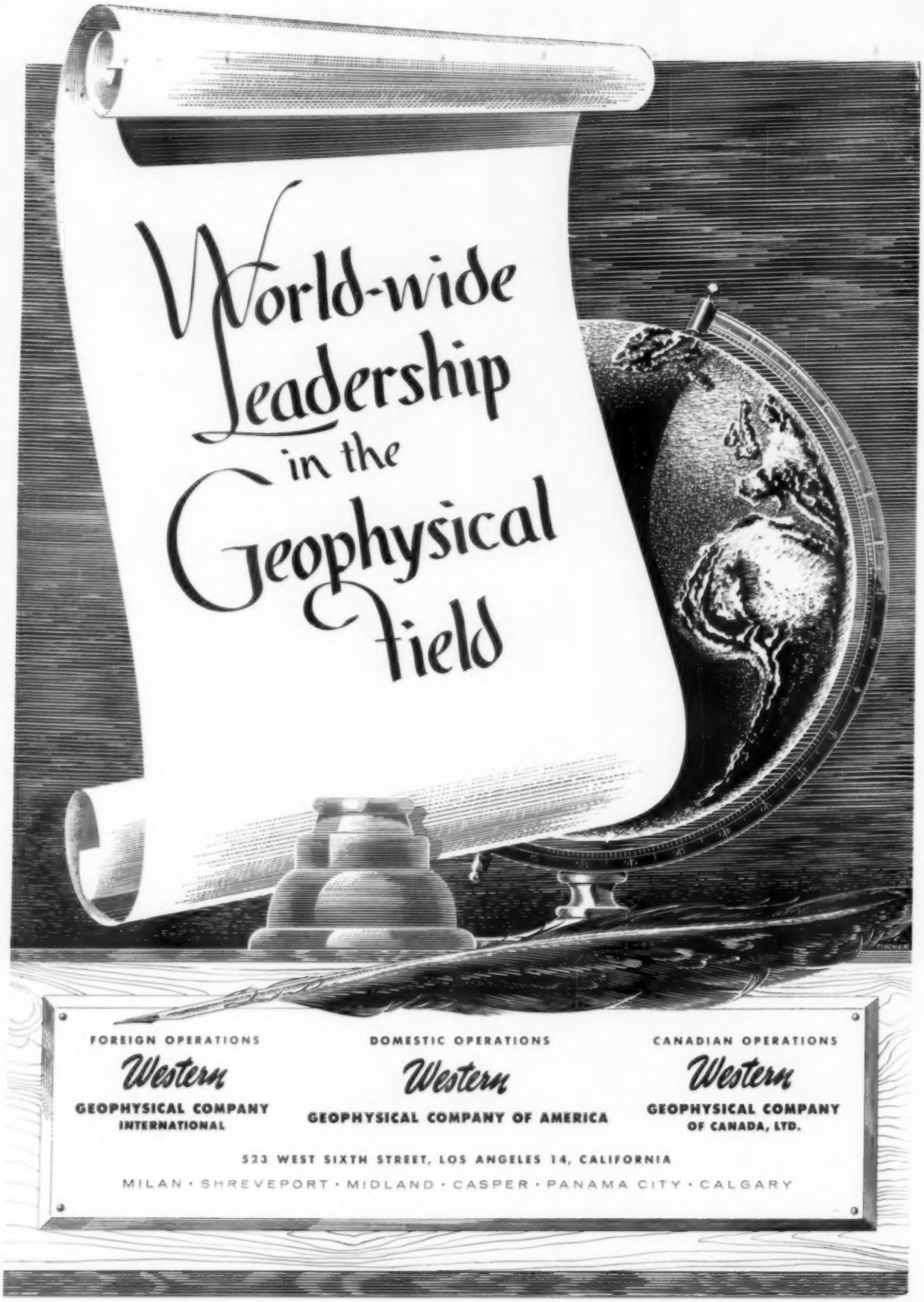
We measure our pipe's strength and ductility. We inspect it thoroughly for roundness... concentricity... accuracy of dimension.

Thus, when you specify electric weld pipe from Kaiser Steel, you can be *certain*. Certain of performance to match your most exacting demands. Certain, too, of service when and where you need it.

Kaiser Steel

built to serve the growing West

Steel Mill Products: plates • hot rolled strip and sheet • cold rolled strip and sheet • tin plate • continuous weld pipe • electric weld pipe • alloy and carbon bars • bar shapes • structural shapes semi-finished steels • pig iron • ingot molds • coke by-products • **Fabricating Division:** steel fabrication for construction, aircraft, missile and other industries • expanded fusion weld pipe reinforced concrete pipe • tanks • For specifications, write: **KAISER STEEL CORPORATION** • **Los Angeles** • **Oakland** • **Seattle** • **Portland** • **Phoenix** • **Denver** • **Tulsa** • **New York**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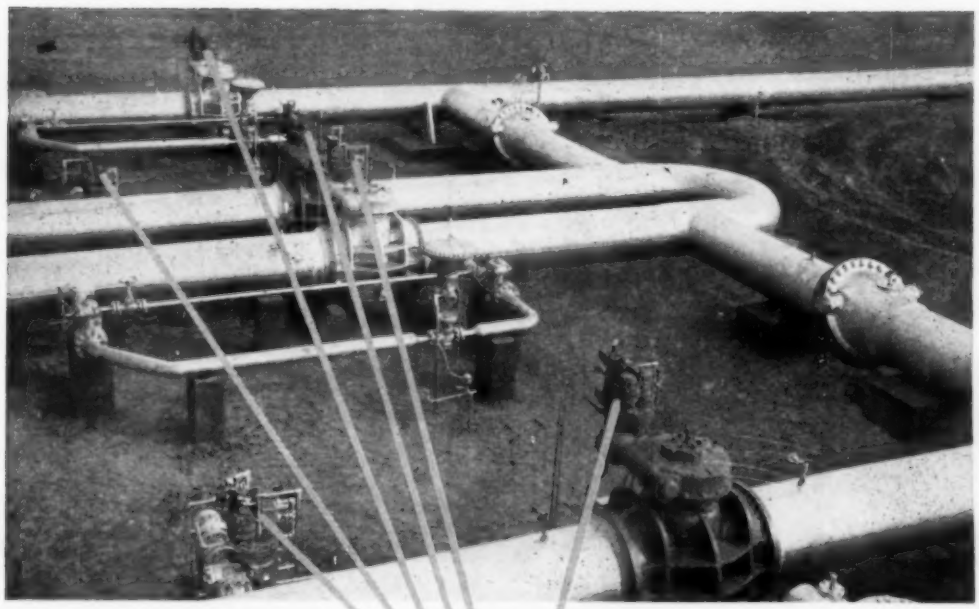

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G-2 TYPE VALVE CONTROLS

Major pipelines depend on over 3,000 G-2 Valve Controls for opening and closing of all sizes quickly and with precision. This type Control is powered by the product in the transmission line without a pressure drop. It is activated remotely by push-button or radio and flashes back a signal when the operation is completed. When you need speed, dependability and accurate control for your pipeline, you know you can depend on E-I-M Valve Controls. Whatever your transmission problem, let our engineers help you solve it.

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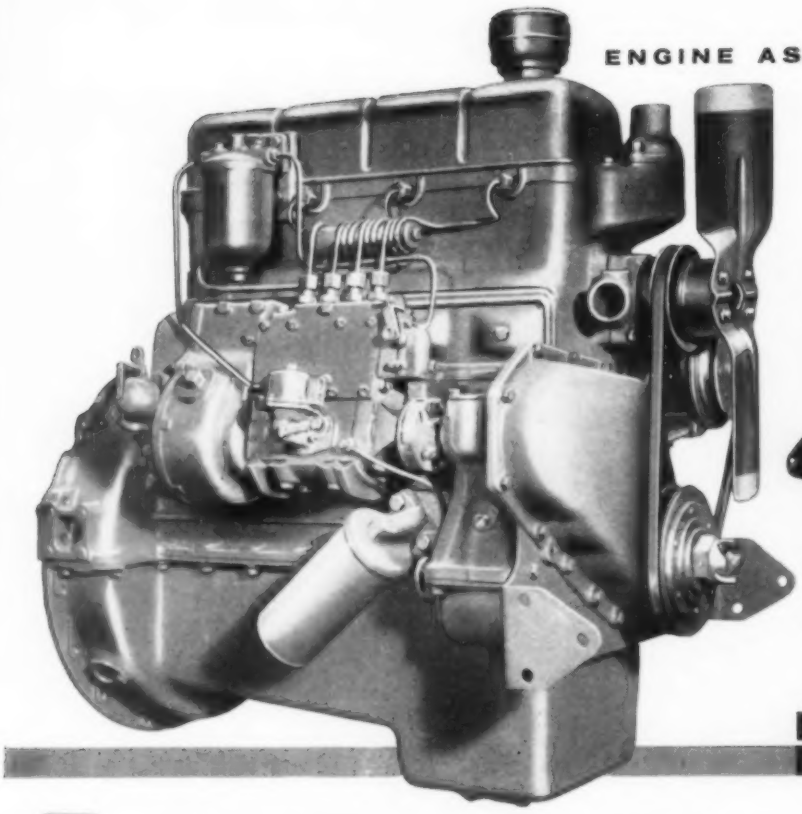
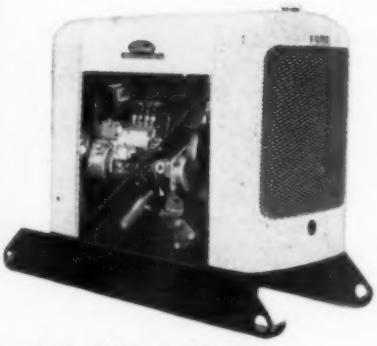
Valve Controls • Speed Reducers • Cooling Tower Drives • Control Valves



ENGINE ASSEMBLY



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For the newest in diesel power... check this FORD "220"

Looking for really *modern* diesel power? You'll find it in the new 4-cylinder Ford "220" Diesel.

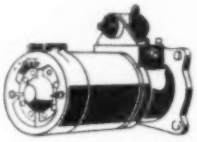
Advanced features such as replaceable cylinder sleeves, rotating exhaust valves, aluminum pistons and balanced crankshaft help deliver a full measure of continuous power. In fact, this 220-cu. in. diesel delivers more sustained horsepower at the flywheel than ever before possible in engines of comparable displacement!

Overhead-valve efficiency boosts economy, makes servicing easier. Rigid deep-block construction extends engine life.

Drop in and see your Ford Industrial Power Dealer for full information on this modern, super-efficient Ford diesel. Or write: Industrial Engine Department, Ford Division of Ford Motor Company, P.O. Box 598, Dearborn, Michigan.

WET CYLINDER SLEEVES

Replaceable cylinder sleeves are positively located, yet are easily removable—eliminating costly reboring. Synthetic rubber seal ring at bottom of jacket.



12-VOLT ELECTRICAL SYSTEM

Dependable high-torque 12-volt starting motor provides faster cranking speeds and delivers extra power for quick starts under all weather conditions.

FORD "220" DIESEL ENGINE SPECIFICATIONS

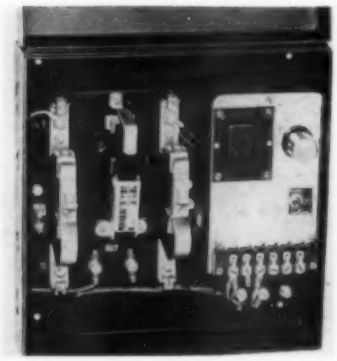
Basic Model		X
Type		4-Cyl. Diesel
Bore and Stroke—Inches		3.93 x 4.52
Displacement—Cubic Inches		220
Brake Horsepower	Dynamometer	60 @ 2250
	Continuous	48 @ 2250
Torque	Dynamometer	151#' @ 1600
	Continuous	121#' @ 1600
Compression Ratio		16 to 1

INDUSTRIAL ENGINE DEPARTMENT • FORD Division of FORD MOTOR COMPANY
P.O. Box 598, Dearborn, Michigan

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

SHOWCASE...

NEW EQUIPMENT



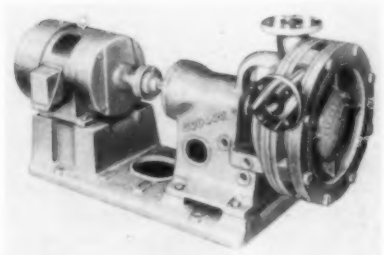
Liquid-Level Control Gives Compact Installation

Mounted in one case complete with all internal wiring, this new Model FLMC Lumenite electronic liquid-level control is activated by the level of the liquid in the vat, reservoir, boiler, or tank to be controlled.

A magnetic switch or contactor is an integral part of the instrument. Thus, installation is simple. Only connection of the power and load lines and the single-line cable to the electrode in the tank to be controlled is necessary.

The control is available in styles and capacities for motor starters or for magnetic valves. Action is said to be instant and positive. **Write or call: Lumenite Electronic Co., 407 South Dearborn Street, Chicago 5, Ill., for details on Model FLMC level control.**

●



Glassed Centrifugal Pump Handles Most Corrosions

Glassed surfaces inside this new centrifugal pump allow it to withstand the effects of most corrosives used in petrochemical plants, the maker reports. All parts of the pump coming in contact with the liquid being handled are glassed and easily cleaned.

The Fig. 3708 glassed pump is reported to be completely inert to all common acids except hydrofluoric. Even at high temperatures, all acids except hydrofluoric and concentrated phosphoric leave the working surfaces unaffected. The glass surfaces are also immune to the corrosive action of all alkalis up to pH 12 and temperatures up to 212° F. The pump normally will withstand quick changes of temperature of the liquids handled, up to at least a 200° F. differential, depending upon the operating conditions.

Available for heads up to 140 ft., it is built in four sizes with capacities to 700 g.p.m. The support head is designed with wide openings, giving ready access to the seal or optional gland and stuffing box. **Write or call: Goulds Pumps, Inc., 32 Black Brook Road, Seneca Falls, N. Y., for details on Fig. 3708 glassed pump.**

●

Refacing Device Repairs Drill-Pipe Shoulders

Box and pin shoulders on rotary drill pipe and drill collars can be refaced at the rig when only a worn or damaged shoulder is causing a joint to leak with this improved shoulder refacing device, the maker reports. The device consists of three parts: a threaded adapter, a tension-nut assembly, and filing-head assembly.

By changing only the threaded adapter, it can be used on 3½, 4, and 4½-in. tool joints with different types of thread using the same tension nut and facing head. The refacing device also is available in other sizes. **Write or call: Big Four Machine & Supply Co., P. O. Box 4006, Capitol Hill Station, Oklahoma City, Okla., for details on shoulder refacing device.**

●

Ball Type of Valve Also Serves as Union

The functions of both a union and a ball valve are combined in this new Worcester Union-Ball valve. Thus, the necessity of installing a separate union to provide a breaking point in a line is eliminated, the maker says. Simple in-line maintenance also is permitted.

The openings in the ball and seat rings maintain the same shape as the inside of the pipe, keeping resistance to flow low. Valve operation is unaffected by flow reversal as the ball is

Send this **Showcase Coupon**

to the **Manufacturer** of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

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Described in OIL AND GAS JOURNAL - Issue of July 29, 1957

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

DATE.....

New Equipment

fitted with twin seals, one on each side.

Metal valve components may be bronze, aluminum bronze, or aluminum. Carbon steel and Types 303 and 316 stainless steel are to be available soon.

Seat and seal materials may be Buna-N, Hypalon, Neoprene, natural rubber, or Teflon. **Write or call: Worcester Valve Co., Inc., 20 Parker Street, Worcester, Mass., for details on Union-Ball valve.**

Flexible Type of Filter May Cut Maintenance

Sand damage to oil-pumping equipment may be reduced with this new flexible type of sand filter, the maker reports. Its filtering element is made of a special synthetic rubber. The flexible element is said to reject sand but allow fluid to pass through its pores.

The filter is constructed of 2-in. perforated seamless A.P.I. tubing which is encased in a special synthetic foam-rubber filter. A coiled steel spring fits over the rubber to protect it, permitting the rubber to flex freely. The filter

is made in a 2-in. size only to fit 2⅜-in. o.d. A.P.I. threaded upset tubing.

Installed below the pump, the filter weighs 29¾ lb., is 24½ in. long, and its outside diameter measures 4¼ in. It's designed to be used in 5½-in. o.d. or larger casing. **Write or call: Clayton Mark & Co., 1900 Dempster Street, Evanston, Ill., for details on sand filter for wells.**

●

Fire Extinguisher Is Lightweight

This new dry-chemical fire extinguisher is said to provide the fire-extinguishing ability of four 1-qt. vaporizing liquid extinguishers. It is only 14½ in. high and weighs only 4 lb.

Called the Model PDC-2A, it features simple hand-squeeze operation. According to the maker, it is harmless, nontoxic, noncorrosive, and will not freeze in any climatic temperature.

The fire extinguisher reportedly is simple to service. A pressure gage on top indicates its readiness for operation. Directions for recharging and pressurizing are on the label.

This model was designed for both home and industry. It is suitable also for automobile protection but it is built with the same quality material as the larger American LaFrance units.

Approved by Underwriters' Laboratories, the extinguisher is suited for the protection of Class B (flammable liquids) and Class C (electrical risks). **Write or call: American LaFrance Corp., F.P.E. Div., Elmira, N. Y., for details on Model PDC-2A fire extinguisher.**

FROM STEAM-BATH WET
TO DESERT DRY
WITH
FLORITE

Most economical of the granular drying agents, Florite has a longer service life, gives a low dew point depression, and aggressively resists "poisoning effects" which permanently destroy adsorption qualities.

Natural gas, propane, butane, gasoline, air, nitrogen, carbon dioxide, refrigeration compounds—and a growing list of liquid and gaseous compounds—are successfully treated with superior drying efficiency by use of FLORITE DESICCANT.

We also have available Fullers Earth and bauxite-based adsorbents for all types of adsorption filtration, including economical decolorization, dehydration and purification.

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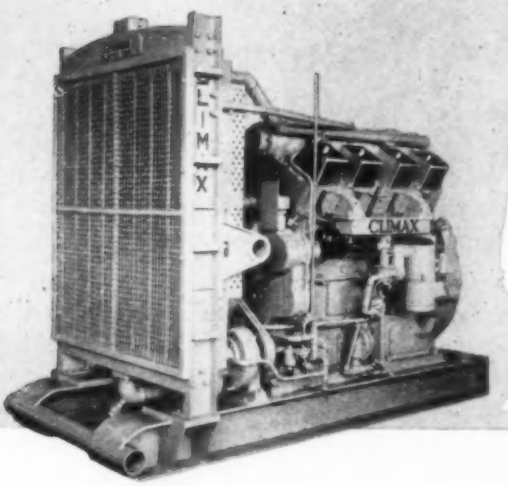
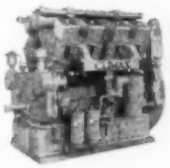
IS THE **OWNER SATISFACTION**
THEY PROVIDE . . . .

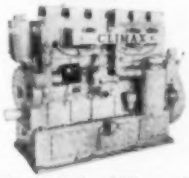


A Complete Line of Oil Field Engines up to 605 H.P.

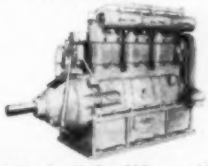
V-125—12 cylinder, 605 max. H.P. at 1200 R.P.M.
V-122—12 cylinder, 520 max. H.P. at 1200 R.P.M.



V-85—8 cylinder, 390 max. H.P. at 1200 R.P.M.
V-80—8 cylinder, 340 max. H.P. at 1200 R.P.M.



K-75—6 cylinder, 302 max. H.P. at 1200 R.P.M.
K-67—6 cylinder, 265 max. H.P. at 1200 R.P.M.



R-165—6 cylinder, 192 max. H.P. at 1200 R.P.M.
R-110—4 cylinder, 130 max. H.P. at 1200 R.P.M.

. . . MIGHTY IMPORTANT TO CONSIDER WHEN YOU BUY AN ENGINE!

Here's why Climax Engines are so "owner satisfying"—

You get an engine that will give years of service on any job . . . whether powering drilling rigs, pumps, compressors or generators.

—an engine designed for easy starting . . . simplified operation . . . equal efficiency on natural gas, butane or gasoline by merely closing one set of valves and opening another . . . easy maintenance . . . readily accessible operating parts and accessories.

—an engine backed by prompt service throughout the oil country . . . friendly Climax Distributors offering a complete stock of parts, repair facilities and factory trained mechanics.

—these, plus many other Climax advantages, add up to owner satisfaction . . . the kind you get when you buy Climax Engines!

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McCullough® REPORTS TO THE OIL INDUSTRY

Service
Anywhere Anytime

New Services • • • New Tools • • • New Methods • • • Outstanding Results

LITERATURE AVAILABLE

If you have not received your copy of our 8-page pamphlet on McCullough Radiation Well Logger, just write McCullough Tool Company, 5820 South Alameda Street, Los Angeles 58, California. We'll send your copy by return mail.

Four Wells Logged and Perforated in 12 Hours

Operator of this Arkansas lease required that all four wells in the project be logged and perforated in one daylight operation.

Average depth of operation was 2200'. Wells were cased with 4½" O.D. 9.5 lb. cemented casing. A portable mast was used on each job. Wells were approximately three miles apart.

McCullough Gamma Ray, Neutron and Collar Logs were run, obtaining 800' of 5" scale then dropping back to bottom and logging to surface on 2" scale.

From 12' to 17' of zone was perforated in each well using 3½" O.D. McCullough 30-shot M-3 Guns. A Total of 378 improved ½" Ogival Bullets were fired in the four wells.

Logging and perforating the four-well project required 12 hours, starting at 7:00 A.M. and finishing at 7:00 P.M. Operator was well pleased with speed, efficiency, trouble-free operations, and completion of the job in the allotted time.

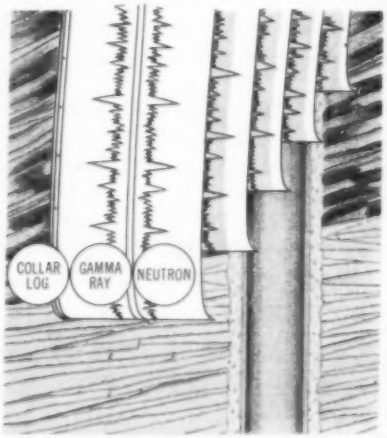
Tough Well Successfully Logged by McCullough

Electric Logs Not Informative – McCullough Radioactivity Log Proves Accurate and Reliable Despite High Pressure and Temperature, Shale Content of Formation and Chemical Mud

A fine example of the efficiency of McCullough's Radiation Well Logger in obtaining reliable and informative logs was recently reported from one of the Mountain States.

This was a wildcat well, drilled to a total depth of 16,500 feet. 5½" O.D. 15½, 18 and 24 lb. casing had been set and cemented to total depth. Bottom hole temperature was 300°. Formation to be tested was the Mesa Verde which is very shaley throughout the Rocky Mountain area.

Two different types of electric logs had been run in open hole by another service company. Neither had proved of value in providing accurate formation information due to high pressures, shale content of the formation and chemical content of the drilling fluid.



Accurate, Clear, Detailed, REPEATABLE Gamma Ray and Neutron Curves

Stability is an important characteristic of McCullough's Radiation Well Logger with Scintillation Counter. It will faithfully duplicate results when run repeatedly under identical conditions.

After casing was set McCullough ran a combination Gamma Ray, Neutron and Collar Log over the bottom 6,500 feet of hole. Actual logging time from start of in-hole log to top of out-hole log was six hours.

The resulting log proved very stable over the entire period of operation. From it, McCullough's Logging Engineer and oil company engineers pin-pointed the formations to be perforated, determined porosities and obtained an accurate sand count. Also, the log accurately correlated with drilling measurements and casing collar locations.

The operator was very satisfied with the successful results of the logging operation.

The jobs described above are certified to be true field reports of services rendered.

McCullough® TOOL COMPANY

Cable Address: MACTOOL

LOS ANGELES
HOUSTON
EDMONTON

SHOWCASE . . .

New Equipment

Bridging Plug Needs No Setting Tool

A setting tool isn't needed with this new self-setting bridging plug for wells, according to the maker. Instead, the plug itself, about 3 ft. long, attaches directly to the suspending cable. The cable is automatically released as the plug is set. The suspension device on the plug, part of the release mechanism, can be made to fit conventional cable supports. A slow-burning propellant in solid form furnishes the force to set the plug.

The solid propellant is reported to be impervious to shock. It burns only under pressure. Firing is electrical, utilizing the same equipment that activates present wire-line devices.

The plug has sets of slips at the top and bottom and a heavy rubber packer between. Made of cast iron, the bridging plug disintegrates readily under a drill bit when its use is finished. **Write or call: Bowen-Itco, 2429 Crockett Street, Houston, Tex., for details on self-setting bridging plug.**

●

Packed-Column Redistributors May Up Plate Efficiency

Plate efficiency of packed column may be increased greatly with this new packed-column redistributor, the maker reports. The redistributor is said to make it possible to utilize the economy and low pressure drop of large-diameter packed columns, while obtaining increased separating efficiency.

The patented unit collects the liquid which tends to run down the column wall in an annular ring and distributes it evenly, by means of vanes, across the packing. A portion of the liquid is intercepted by the vanes, equalizing still further the distribution.

By means of the redistributor, it is possible to keep the packing wet and at maximum efficiency at all liquid rates, the maker claims. The redistributor is so designed that it has no effect on pressure drop, holdup, or throughput rate.

The larger sizes with diameters of 10 in. or more come either with packing rings or so they can be welded directly into the column. Both the large and small models are supplied in Type 316 stainless steel as standard construction, or in other metals as required. The size range includes diameters from 2 in. up **Write or call: Distillation Engineering Co., 105 Dorsa Avenue, Livingston, N. J., for details on packed-column redistributors.**

●

Fibrous Teflon Sheets Filter Variety of Fluids

These highly porous fibrous sheets made of Teflon tetrafluoroethylene resin offer a variety of uses in filtra-

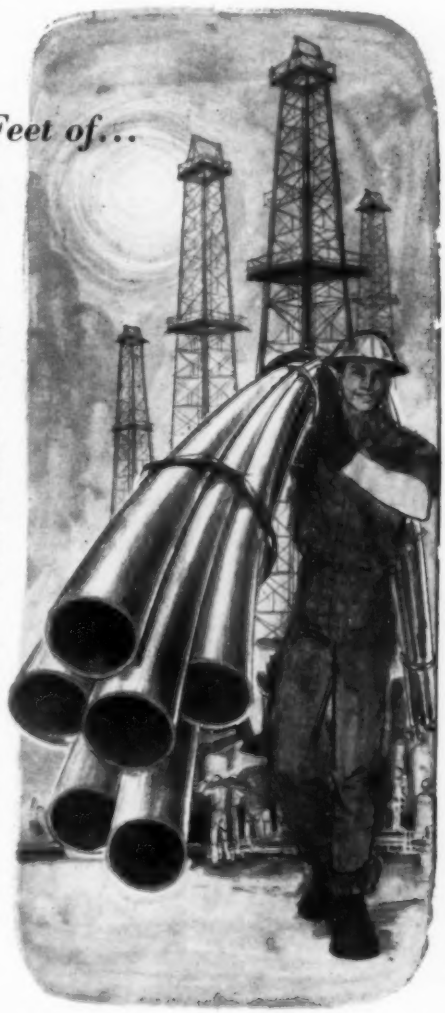
Over One Million Feet of...

KRALOY

HIGH-IMPACT

PVC PIPE

in oil-country use today



This proves that there is no substitute for Kraloy experience.

KRALOY is the most experienced manufacturer of PVC plastic pipe for the petroleum industry. The first polyvinyl chloride lead line installed in this country—at Great Bend, Kansas—was Kraloy Pipe. Kraloy High-Impact PVC today is preferred by production men for maintenance-free service in lead lines and disposal systems. Kraloy customers use Kraloy High-Impact PVC pipe for lead lines, gas lines, and salt water lines because Kraloy normally eliminates (1) sulphur corrosion due to sour crude, (2) paraffin buildup, (3) corrosion and scale, (4) trouble from soil electrolysis.

YOU Benefit From KRALOY'S Quality Control

To insure quality control, random samples of Kraloy Plastic Pipe are tested daily in Kraloy's own laboratory for burst pressure, impact resistance, and tensile strength under standard ASTM specifications.

Kraloy Pipe is Sold Only Through Qualified Supply Stores

Warehouse stocks and sales representatives:

Great Bend, Kansas:
Robinson Oilfield Specialties Co.,
616 Main St.

Houston, Texas:
The Mott Company,
1719 McKenney St.

Tulsa, Oklahoma:
The Becker Sales Company,
2837 Sands Spring Rd.

For case histories of actual Kraloy installations, cost comparison tables between Kraloy and other pipe, plus detailed instructions and specifications for all field uses, write to:

KRALOY *plastic pipe co., inc.*

4720 East Washington Boulevard, Los Angeles, Calif.

Subsidiary of the Seamless Rubber Co., a **Rexall Drug Co.** Subsidiary

New Equipment

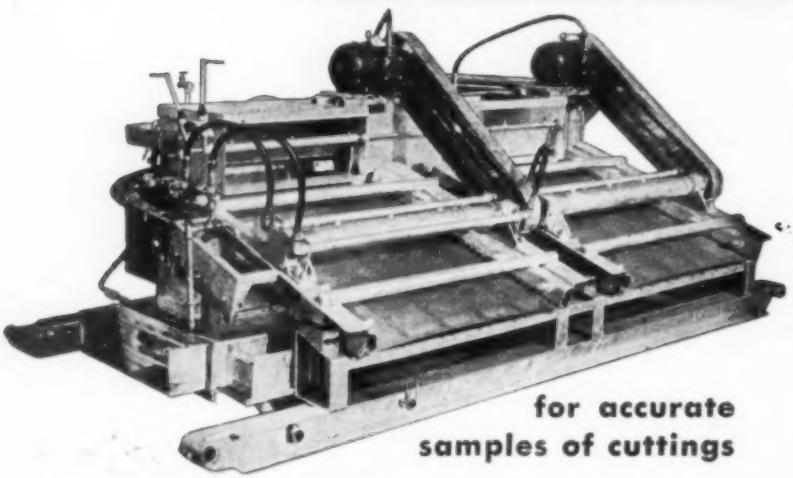
tion processes, according to the maker. Called Armalon, the sheets can withstand exposure for 7 days at 550° F. Their potential uses include filtration of strong acids and bases, virtually all solvents, liquid fuels, lubricants, and hydraulic fluids over a wide temperature range.

Laboratory data indicates the fibrous sheets are effective in removing fine particles from liquid suspensions under severe conditions.

Not readily wetted by water, the new materials also may be useful for separating water droplets from many organic liquids, such as gasoline. They are said to be serviceable at temperatures from below —100° to +400° F. (or higher under certain conditions). They will withstand attack of strong acids and bases and are unaffected by water or any common fuels, lubricants, hydraulic fluids, and solvents. They will not adhere firmly to any known materials and have an extremely low coefficient of friction. **Write or call: E. I. du Pont de Nemours & Co., Wilmington 98, Del., for Bulletin 6.**

Thompson

DOUBLE VIBRATING SHALE SHAKER...and SAMPLE MACHINE



for accurate samples of cuttings

The THOMPSON SHALE SHAKER SAMPLE MACHINE offers the operator and geologist one of the best methods available for obtaining accurate foot-by-foot samples of well cuttings.

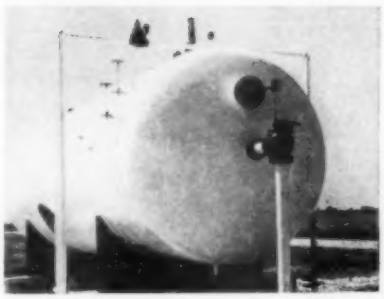
This THOMPSON DOUBLE VIBRATING SHALE SHAKER and SAMPLE MACHINE is specially engineered for off-shore barges or islands, deep wells, or wells using big volume and high pressure mud pumps. It is available either plain or galvanized, which makes it rust and deterioration-proof on off-shore or coastal duty.

THOMPSON Shakers are famous for their highly efficient service at any depth or flow and for their economical first cost.

Make sure THOMPSON'S on the job for accurate samples and clean mud.

SOLD ONLY THROUGH SUPPLY STORES

Thompson TOOL CO. IOWA PARK TEXAS

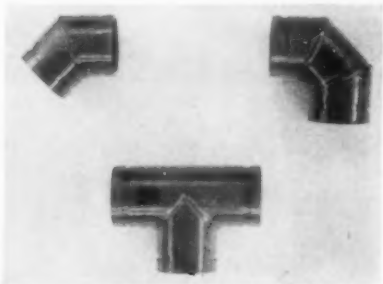


Oil Skimmer Has High Water Capacity

Here's a new horizontal oil skimmer available with daily water capacities ranging to more than 15,000 bbl. The skimmer is available in seven models.

Working pressure of the skimmer is 40 psi. for the five smallest models and 25 psi. for the two largest units. Skimmer pressure is maintained by a gas equalizer connection which, in most cases, eliminates the need for pumps to move discharge water on to disposal points, the maker reports.

Standard equipment includes interface controller assemblies, lever-operated water-discharge valves, 2-in. liquid-head-operated oil-discharge valves, 2-in. relief valves, pressure gages with shutoff valves, two gage-glass assemblies, and inert packing material for the units' water-distribution sections. Skid mounts and liquid meters for both oil and water discharge are optional. **Write or call: Delta Tank Mfg. Co., Inc., P. O. Box 1469, Baton Rouge, La., for details on oil skimmers.**



Grooved Fittings Fit Most Couplings

These new Shur-Loc grooved fittings are built for use with any standard grooved coupling, the maker announces. They are available in 45° and 90° ells, and in tees in 2, 3, and 4-in. sizes.

Made of steel pipe, the fittings are said to be lightweight and full opening. They will withstand the same hydrostatic pressure as pipe of a compa-

With Magcobar on your well

logging can begin on time, on schedule to save you money

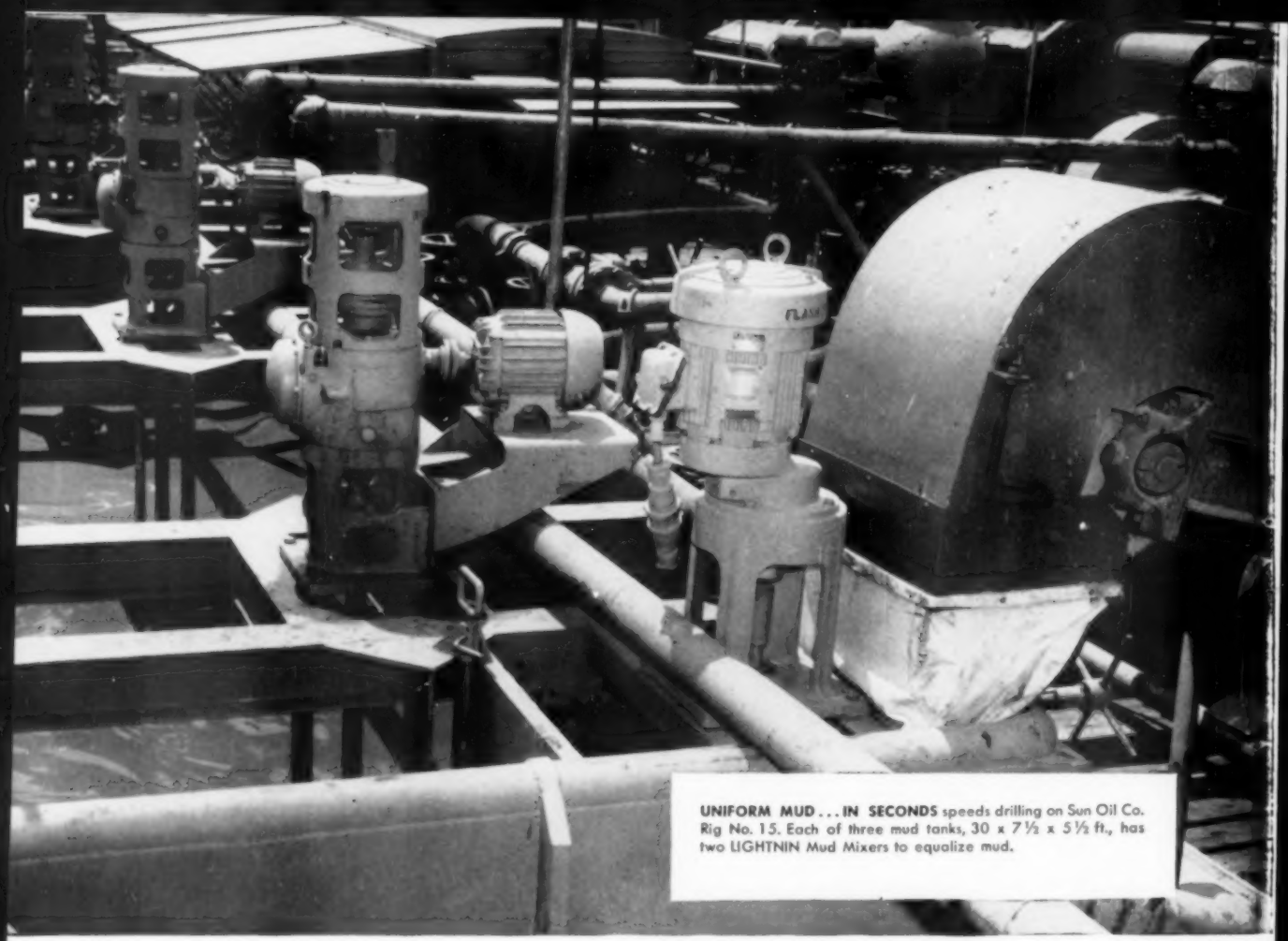
A well-planned and executed mud program can save money all along the line. For example, when the mud is properly conditioned for logging, with the proper weight, the right viscosity, correct gel strength, etc., logging proceeds on schedule without costly delay. Your well is ready for logging as soon as the desired depth is reached. When desired, mud resistivity can be controlled to improve log interpretation. To help you in both the planning and the execution of your mud program, the Magcobar team will work right along with you.

Magcobar's complete drilling mud service brings you the right drilling mud chemicals for each foot of hole. Magcobar's mud engineers are the best trained and best qualified in the mud industry. The full facilities of Magcobar can help you to lower the over-all cost per foot of hole drilled. Plan now to make full use of Magcobar's *complete* drilling mud service on your next well.

Magnet Cove Barium Corporation
Houston, Texas

Magcobar®
Complete
DRILLING MUD SERVICE

57-101



UNIFORM MUD . . . IN SECONDS speeds drilling on Sun Oil Co. Rig No. 15. Each of three mud tanks, 30 x 7½ x 5½ ft., has two LIGHTNIN Mud Mixers to equalize mud.

How Sun gets **uniform mud . . . fast** *on big new diesel rig*

You're looking at one of the speediest—and safest—mud conditioning systems ever put into operation on a big rig.

See how every part of this mud system, on Sun Oil Co.'s new diesel-electric Rig 15, makes for uniform mud and rapid drilling:

1. The belt conveyor, at right, dumps bulk mud into an open-bottom mixing well equipped with a LIGHTNIN Flash Mixer. High-speed propellers break lumps and disperse mud and other ingredients instantly—as fast as they are fed in.

2. In each tank, two LIGHTNIN Mud Mixers drive mud throughout the tank in a strong, interchanging flow. All the mud is in motion at once. Every gallon of mud is at correct weight and viscosity—ready for instant use. Mud doesn't settle out, so less mud is used.

3. When weight or gel material is added, mud consistency starts to change at once. Any addition is equalized throughout the tank quickly.

How to get instant control

You can get mud control like this with LIGHTNIN Mixers on your rigs. Keep mud evenly mixed with practically no attention. Increase mud weight and viscosity by the exact amount you want—in seconds.

You take no risk with LIGHTNINS. Results are guaranteed, unconditionally.

Not only do LIGHTNINS help you drill faster—they look good on the cost side, too. Maintenance is much less than with other equipment. *And you need no auxiliary mud pump.*

Get facts firsthand

See for yourself how LIGHTNIN Mixers can give you *better* mud control, for *less* money. Just ask your LIGHTNIN sales engineer to arrange a visit to a rig in your area where LIGHTNINS are at work. You'll find his name in Composite Catalog. Give him a call today.

SEND FOR this free 6-minute picture story. It shows how you can get instant mud control and cut costs, too, with LIGHTNIN Mixers. Just drop us a postal, asking for Bulletin B-502.

Lightnin® Mixers

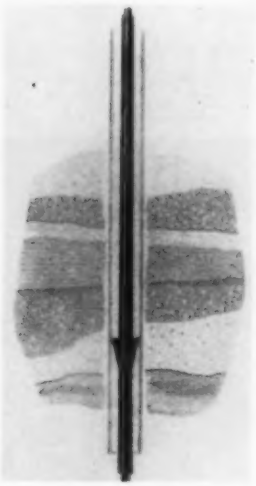
MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 174-g Mt. Read Blvd., Rochester 11, N. Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.

rable size. Easy to connect, they can be used repeatedly. Small angle adjustments can be made in the field by heating and bending.

Malleable clamp couplings are soon to be available for use with the fittings. The couplings will be fitted with synthetic-rubber gaskets. **Write or call: Enardo Mfg. Co., 2729 Sand Springs Road, Tulsa, Okla., for details on Shur-Loc fittings.**



Liquid Dump Bailer Aids Inhibitor Placement

All internal surfaces of well tubing can be reached with this new device for applying liquid corrosion inhibitors, the maker claims. It's called the Barnes liquid-dump bailer.

An 11-ft.-long stainless-steel tube-like device, it is lowered into the well by conventional wire line. When it passes the tubing joint where maximum corrosion exists, its direction is reversed, causing dump flanges to engage the tubing walls or at a collar. This action unseats an O-ring seal, dumping concentrated liquid inhibitor in the desired area. The concentrated inhibitor then flows up the string, treating the tubing.

An important advantage the dump bailer gives is to permit the inhibitor to reach all internal surfaces of the tubing.

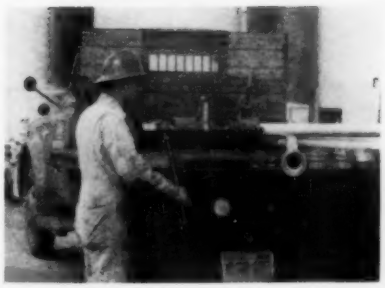
Shut-in periods during or after treatment are said to be limited to about 1 hour on a run of 8,000 to 9,000 ft. **Write or call: Galloway Engineering Co., P. O. Box 2343, Beaumont, Tex., for details on Barnes liquid-dump bailer.**

Pipe-Coupling Tool Developed for Aluminum

On-the-job aluminum line-pipe connections can be made readily with this new coupling tool.

Only four simple steps are required for attaching pipe couplers: (1) placing pipe in the saddle of the flanging tool, (2) flipping a cam-action locking device and positioning the coupler, (3) turning the ratchet type of handle clockwise to automatic stop, and (4) releasing the locking device.

No special skill is required for attaching couplers to line pipe with the



attaching tool. **Write or call: John Bean Div., Food Machinery & Chemical Corp., San Jose 4, Calif., for details on pipe coupling tool.**

competition *makes it better!*

THERE'S NOTHING fishy about the benefits of competition. It makes everybody happy because it gives everybody a chance to pick the best. Competition makes oil well cementing better, too. Next time you need a cementing job, pick the company that put competition in the business.

Engineered answers to oil well cementing

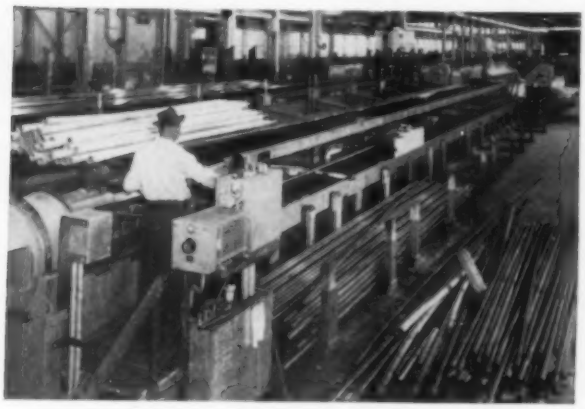
BJ SERVICE, INC.

For details, see page 338

Here's why you get that extra measure of performance from **BRIDGEPORT** condenser tubes

1 ELECTRONIC SPECTOGRAPH analyzes the composition of alloys from which condenser and heat exchanger tubes are made. From the very beginning, product performance and customer satisfaction are essential. Maintaining high metallurgical standards means high tube quality—it starts here.

From spectograph to shipping, every step of Bridgeport Condenser Tube manufacture is carefully and closely controlled. Research, experience, skill and attention to your individual needs are integral qualities of every Bridgeport Condenser Tube that pay off in performance. Put them to work for you by calling your local Bridgeport Sales Office.



2 MODERN DRAW BENCH (its size speaks for itself) and others of the same "caliber" bring copper, alloy condenser and heat exchanger tubes down to exact, uniform dimensions.

3 HIGH-TEMPERATURE ANNEALING FURNACES give tubes the proper physical characteristics.

4 CLOSE INSPECTION of diameter, wall thickness and surface finish is made—another step that assures you that your Bridgeport tubes are made to flawless standards.

5 CORROSION RESEARCH is continuous at Bridgeport Corrosion Laboratories. Here the many alloys used under all corrosive conditions are tested; new alloys are developed from the knowledge and experience acquired here and in the field.

BRIDGEPORT CONDENSER TUBES

Bridgeport Brass Company • Bridgeport 2, Conn. • Offices in Principal Cities

In Canada: Noranda Copper and Brass Limited, Montreal

SHOWCASE . . .

New Literature

Gas-Lift Practices and Principles Manual 457 (128 pages) explains in detail the basic principles of gas-lift operations. Comprehensive and well illustrated, the manual is divided into four sections. It covers both intermitting and continuous-flow gas-lift operations. A 12-page engineering section includes tables listing conversion-factors, sizes and capacities of A.P.I. casing and tubing, annulus-to-tubing ratios, annular volume between inner tubing string and outer casing string, and the capacity of orifices for free air. The informative manual provides a clear insight into gas-lift practices and procedures. **Write or call: Merla Tool Corp., P. O. Box 2576, Dallas 21, Tex., for Manual 457.**

●

Surfactant and Emulsifier for oil-well drilling fluids, named Trimulso, is described in this new four-page three-color data sheet. The emulsifier described is used to make oil-in-water emulsions for clear-water drilling or in low-solids mud. A completely new product, its functions are not characteristic of any previously offered standard drilling mud additive, according to the data sheet. The data sheet explains what Trimulso mud is, its advantages, how to prepare and maintain the mud, and how cuttings are treated for geological examination. **Write or call: Baroid Div., National Lead Co., P. O. Box 1675, Houston 1, Tex.**

●

Industrial Protective Creams. This leaflet describes industrial creams for protecting hands from organic liquids such as kerosine, chlorinated hydrocarbons, paints, thinners, and water or water dissolved materials, such as acids and alkalies. The leaflet also describes a waterless hand cleaner for the removal of stubborn dirt and grime. **Write or call: Boyer Campbell Co., 6540 St. Antoine, Detroit 2, Mich., for leaflet on industrial protective creams.**

●

Tubing and Piping for Elevated Pressures and Temperatures are covered in new bulletins 145A and 152A. Bulletin 145A discusses B&W Croloy 2¼ (2.25 per cent Cr, 1 per cent Mo) and Bulletin 152 deals with B&W Croloy 1¼ (1.25 per cent Cr, .5 per cent Mo). Tubing, pipe, welding fittings, and flanges of these steels are widely used in refinery, petrochemical, and steam services. The folders present technical data on analysis, mechanical and phys-

STANDARD OF THE INDUSTRY SINCE 1936

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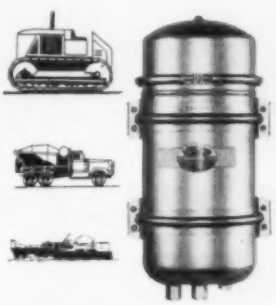
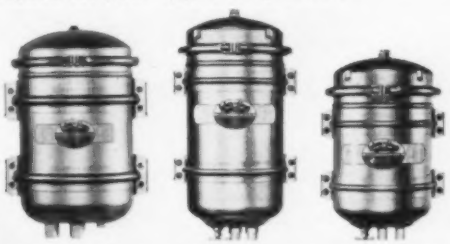
FOR EVERY TYPE OF ENGINE EVERY TYPE OF OIL

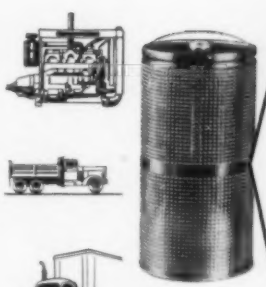
STANDARD and OPTIONAL EQUIPMENT ON LEADING DIESEL TRUCKS TRACTORS & STATIONARY ENGINES

Only a Luber-finer Filter Unit with a genuine Luber-finer Pack produces the patented filtering process that gives engineered protection to engine and oil as recommended by equipment manufacturers. The vital oil supply is circulated through Luber-finer's exclusive specially processed media which removes not only the injurious suspended solids from the oil but also the colloidal impurities which are often more damaging, thus increasing the life of both engine and oil. *The Efficiency of Luber-Finer's Patented Process has never been equalled!*

The Luber-finer patented filtering process returns the oil to the engine with the excellent lubricating qualities as specified by the manufacturers of today's modern high powered engines, resulting in the addition of thousands of miles to engine and oil life. Every minute—every mile your engine is run it must be protected. There's a Luber-finer model especially designed for your type of engine or oil.







DON'T BE MISLED! ONLY GENUINE LUBER-FINER PACKS GIVE EXCLUSIVE ENGINEERED PROTECTION

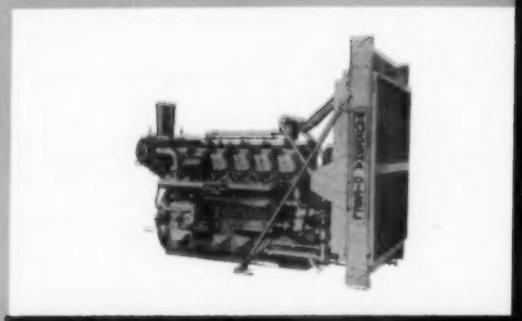
DIESELPAK — Designed for use with H.D. detergent compounded oils. May also be used with fuel oils and straight mineral oil. Removes impurities and contaminants—without affecting the additives.

REFINING PACK—Designed for use with straight mineral oils, fuel oils, hydraulic oils and inhibited industrial oils.

The Refining Pack, which combines ABsorbent with ADsorbent filtration, removes acids, moisture, suspended particles and colloidal impurities during its effective life more efficiently than any other filter.

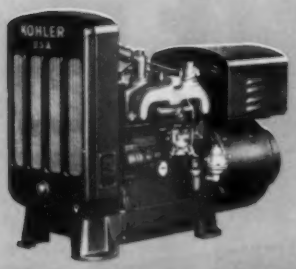
Write for complete information to Dept. 92

LUBER-FINER, INC. 2514 S. Grand Ave., Los Angeles 7, Calif.

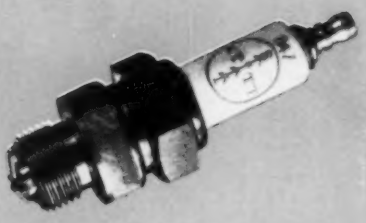


Waukesha **WAUKESHA** Engines are world-famous for their economy and reliability. We carry a complete line of Waukesha Engines, Power Units and Genuine Waukesha parts. Natural gas, LPG, Diesel, Gasoline, ranging from 10 to 1100 hp.

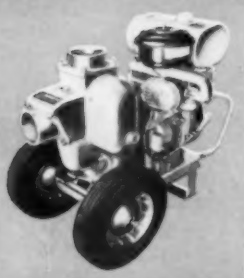
WAUKESHA SALES & SERVICE,



KOHLER **KOHLER** Electric Plants and Air-Cooled Engines provide an independent source of electric power capable of performing hundreds of routine jobs as well as providing essential standby protection against power failure. 500 watts to 30 kw.



STITT Industrial Spark Plugs are designed for continuous heavy-duty service. Massive center electrodes, three wide ground wires and extra-heavy construction, with modern, aluminum oxide insulators, make for economy and long life.



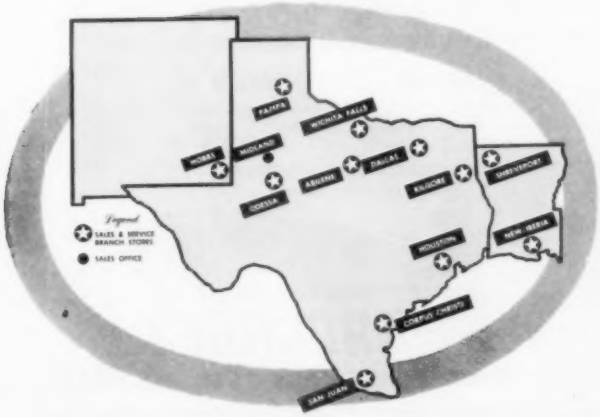
MARINE PRODUCTS Pumps—MP Straight Centrifugal Pumps for general applications, Flomax Self-Priming Centrifugal Pumps and Duraflex Rotary Pumps.

AMERICAN M.A.R.C. Diesel Power Units are well-known for low maintenance cost and operating economy. American M.A.R.C. Air-Cooled Engines are the ideal power plant wherever a 5 to 15 hp requirement exists.

Inc. COVERS A LOT OF GROUND

From the Permian Basin to the coastal flats, Waukesha Sales & Service, Inc. is ready to serve you, around the clock. With twelve service points serving a four-state area, your engine is never more than a few hours away. And when you send your engine "home" to Waukesha Sales & Service, Inc. you are assured of **genuine** Waukesha parts and other name brand equipment, plus expert workmanship.

WAUKESHA SALES & SERVICE, INC. supplies dependable power for every need: drilling, pumping, hoisting, lighting, transportation. Our expert, personalized service keeps this power in tip-top shape.



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EXCLUSIVE DISTRIBUTORS FOR WAUKESHA PRODUCTS IN TEXAS, NORTH AND WESTERN LOUISIANA, SOUTHERN ARKANSAS AND NEW MEXICO

WORLD'S LARGEST DISTRIBUTOR OF OIL FIELD ENGINES

NEW LOADCRAFT 808 OIL FIELD FLOAT

HIGH STRENGTH *Feather Weight*

HAS 50,000 POUND CAPACITY

SPECIAL FORMULA 808 STEEL PROVIDES ULTIMATE IN WEIGHT-STRENGTH RATIO

Now, here's an all new heavy-duty oil field trailer that actually weighs less than conventional trailers, yet it rated for as much as 5 tons more payload. This great buy will actually pay for itself with extra earnings from time and trips saved, but you pay no more than for an ordinary trailer. It is made entirely of special formula 808 steel with full 18" deep frame and 9" outer rail. It is designed for three point stability in nose loading . . . has oversize rolling tail pipe with self-aligning bushings for rear loading. Equipped with new Loadcraft combination bar-spring tandem.

A RUGGED PERFORMER

This baby has the guts for the biggest jobs. It has been scientifically designed . . . fully field tested.

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ical properties, fabrication, heat treatment, and maximum allowable working pressures for various applications at different metal temperatures. **Write or call: Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa., for Bulletins 145A and 152A.**

•

Products and Processes for Surface Treatment of Metals are the subject of this new 84-page booklet. The booklet covers rust prevention, mechanical and chemical cleaning, blackening, phosphating and other aspects of the field of metal-surface treatment. It diagrams various treatment processes or illustrates them photographically. A complete listing of Houghton products available for surface treatment is also presented. **Write or call: E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pa., for "Surface Treatment of Metals."**

•

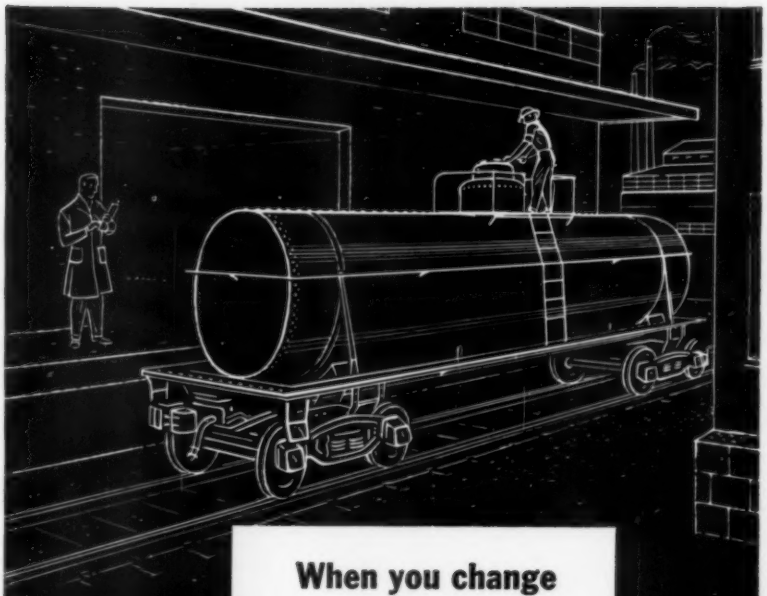
Wheel Type of Ditcher. This eight-page two-color folder describes the new Barber Greene Model 774 wheel type of ditcher. Diagrams and photographs detail the ditcher's features. The features include: (1) a flexible connection between the chassis and digging wheel, (2) a hydraulic spoil-conveyor drive and wheel hoist, and (3) finger-tip control of an infinite range of forward crowding speeds. Job pictures show the Model 774 at work under a variety of conditions from spring mud to 26° below zero temperatures and on a range of job applications. **Write or call: Barber-Greene Co., 400 North Highland Avenue, Aurora, Ill., for folder on Model 774 ditcher.**

•

Flow Characteristics of Butterfly Valves are explained in the May-June issue of "Valve News." The four-page publication includes curves giving a quick view of their flow characteristics based on the flow-coefficient (C_v) rating. One curve gives the dynamic torque due to flow in the valve at varying positions of the valve disk. The other gives the flow through the valve at varying positions of the disk. **Write or call: W. S. Rockwell Co. 198 Eliot Street, Fairfield, Conn., for May-June 1957 issue of "Valve News."**

•

Fire Protection Systems. A complete discussion of the nature and advantages of fire protection systems is included in new Bulletin 66, titled "The ABC of Fire Protection." Containing 36 pages, illustrated, and printed in two colors, the bulletin goes into an explanation of the insurance savings and



When you change raw materials... consider the FIRE HAZARD factor!

Perhaps the use of a new type of raw material can help you lower cost or increase sales. But if that material is a flammable liquid, be sure your program for fire protection meets your new requirements. Ask National Foam for helpful recommendations!

NATIONAL FOAM System, Inc.
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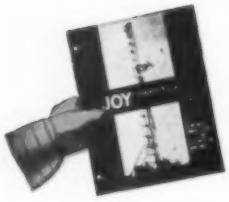
NATIONAL FOAM FIRE PROTECTION SYSTEM

The only company exclusively engaged in the design, development and manufacture of foam fire protection equipment and chemicals.

SLIM HOLES TO 5100 FEET WITH THE *Joy* 510



Get the complete story on this modern slim hole rig . . . write for Bulletin 154-31

HERE'S A RIG DESIGNED FOR SLIM HOLE WORK—either deep exploration or slim hole production. It's completely portable, mounted on a single trailer for fast rig-up and tear-down . . . lightweight, yet has all the rugged features of the largest rigs: LARGE ROTARY TABLE OPENING with standard API taper . . . AIR CLUTCHES for sensitive control of hoisting drums and rotary drive . . . TORQUE CONVERTER for infinitely variable speed and torque multiplication. Find out more about the economies of operating this true slim hole rig . . . write to ***Joy Manufacturing Company, Oil Field Drill Division, P.O. Box 35326, Airlawn Station, Dallas 35, Texas.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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27 SALES & SERVICE LOCATIONS

Denver, Colo.; Salt Lake City, Utah; San Francisco and Los Angeles, Calif.; El Paso, Texas; Carlsbad, N.M.

Baash-Ross Tool Co. Div.—Abilene, Corpus Christi, Houston and Odessa, Texas; Harvey, New Iberia and Shreveport, La.; Ardmore and Oklahoma City, Okla.; Avenal, Bakersfield, Long Beach, Newhall, Taft, and Ventura, Calif.; Casper, Wyo.; Hobbs and Farmington, N.M.; Olney, Illinois.

Export Sales—Joy Manufacturing Company, 60 E. 56th St., New York, N.Y.

OAKITE LSD

Liquid Steamcleaning Detergent

The label is hardly dry on Oakite LSD—and already enthusiastic reports are coming in about this new liquid detergent compounded specially for steamcleaning.

With this modern detergent you get the full benefits of power cleaning—convenience, speed, economy. It's just the thing for removing those oily, greasy soils typical of refining operations. And LSD means Low Steamcleaning Dollars because it takes only 1 to 2 oz./gal. concentrations for powerful cleaning action.

Here are some extra advantages of Oakite LSD:

- **Goes into solution instantly**
- **Minimizes coil clogging**
- **Useful on light or heavy cleaning**
- **Rinses clean with plain steam**
- **No objectionable fumes**
- **Works equally well in self-generating steam units or Oakite steam guns**

Ask your local Oakite Technical Service Representative to demonstrate this new Oakite development, or write for details to Oakite Products, Inc., 44C Rector Street, New York 6, N. Y.

OAKITE

Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

other economic benefits which fire protection makes possible. It also describes the range of fire-protection components and systems manufactured by the company. The bulletin includes a two-page two-color chart of the applications and functions of the different types of systems. It covers fixed temperature, rate of temperature rise, and alarm and control systems. Fire-extinguishing methods used in the system include water sprinklers, water fog, air foam, chemical foam, dry chemicals, and carbon dioxide. **Write or call: Automatic Sprinkler Corp. of America, Youngstown 1, Ohio, for Bulletin 66.**

●

Preventing Corrosion with Glasfab Torch-Tape is the subject of this new four-page brochure. It gives the manufacturer's specifications and the fields of application for the tape. They include above and below-grade process piping. The tape is made from loom-woven open-mesh glass cloth completely filled and loaded to a thickness of 60 mils with a specially formulated plasticized coal-tar pitch. **Write or call: Twinsburg-Miller Corp., P. O. Box 207, Twinsburg, Ohio, for brochure, Glasfab Torch-Tape.**

●

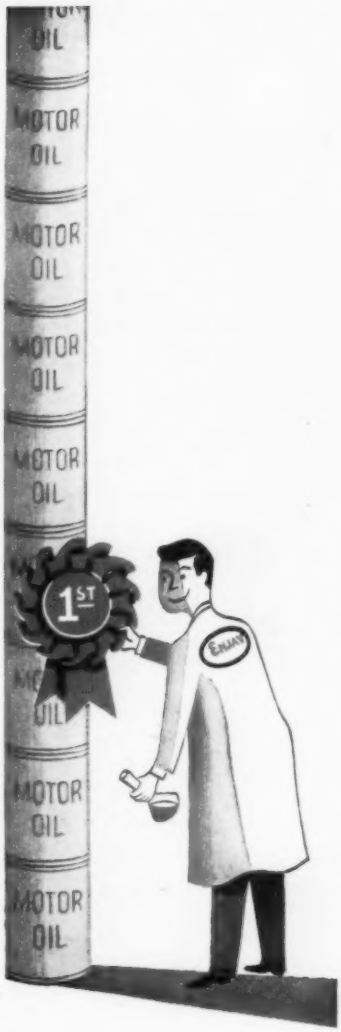
Valves for Corrosive Services are the subject of new Jenkins Folder 205. It gives information about cast-iron gate valves with Type 316 stainless-steel trim. These materials are said to show unusual resistance to corrosion and erosion in services that include acids, salt, and alkaline solutions, sea water, brine, or other corrosive fluids, vapors, or gases. **Write or call: Jenkins Bros., 100 Park Avenue, New York 17, N. Y., for Folder 205.**

●

Crown Blocks for all well-drilling requirements are presented in new Bulletin 470. It furnishes data on design features and complete specifications for five sizes ranging from 120 to 525 tons capacity. **Write or call: National Supply Co., Two Gateway Center, Pittsburgh, Pa., for Bulletin 470.**

●

Volumetric Feeder for feeding from 1 to 5,000 lb. per hour of any dry material is the subject of new eight-page Bulletin 20-P2. Informative sections describe the various models, their design features and principles of operation, and show allied accessories. The bulletin includes capacity and dimensional data and illustrations. **Write or call: Omega Machine Co., 345 Harris Avenue, Providence 1, R. I., for Bulletin 20-P2.**



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BLEND WITH ENJAY PARAMINS®*

*the *only* complete line of high-quality additives for fuels and lubricants.

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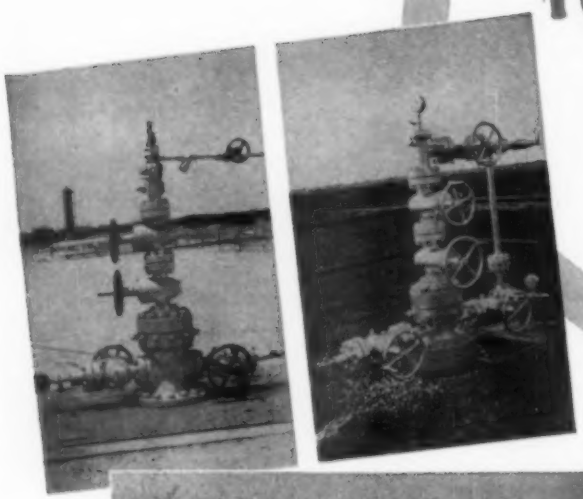
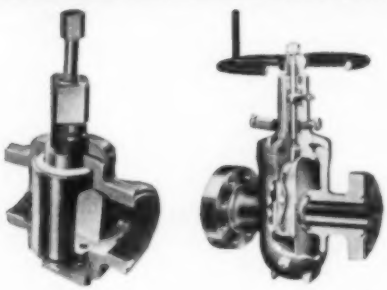
FROM W-K-M

high PRESSURE and low PRESSURE valves





Here's wide range availability for both high and low pressure services from **W-K-M**.

For safe and positive high pressure control on christmas trees, flow wings, and flow lines, it's **W-K-M** Through-Conduit Gate Valves to handle working pressures from 500 to 15,000 psi.

For "expressway" turbulence-free flow in oil and gas pipelines, it's **W-K-M** ASA Through-Conduit Gate Valves from ASA 300 lbs. to ASA 1500 lbs.

For gathering lines, manifolds, headers and similar low pressure services, it's **acf** Lubricated Plug Valves—200 to 500 lbs. WOG.

You need dependability, performance, minimum maintenance! You need **W-K-M** and **acf** Valves, designed specifically to meet your requirements, in oilfield services, on pipelines, in refineries, in process and chemical plants, and wherever valves are required to control the flow of liquids or gases.

Complete your file of valve information by writing for these W-K-M Catalogs. Address Dept. A-729

W-K-M Catalog 200	W-K-M Through-Conduit Gate Valves for oil field services
W-K-M Catalog 300	W-K-M ASA ThroughConduit Gate Valves
W-K-M Catalog 400	ACF Lubricated Plug Valves
W-K-M Catalog 800	ACF Lubricant Manual

W-K-M

DIVISION OF **acf** INDUSTRIES INCORPORATED

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MANUFACTURERS OF W-K-M GATE VALVES · acf LUBRICATED PLUG VALVES · KEY-KAST ALLOY STEEL PIPING FITTINGS · KEY RETURN BENDS AND FITTINGS

EQUIPMENT MEN . . . in the News

Alco Products Names Agent For Midwestern Area

Arnold A. Hanson has been named by Alco Products, Inc., as exclusive agent for Alcotwin heat exchangers and other longitudinal finned-tube products. Hanson's area will include Minnesota, Iowa, Wisconsin, the upper Michigan peninsula, northern Illinois, and northern Indiana.

Hanson is associated with Industrial Process Equipment Co. and headquarters with that firm in Wheaton, Ill. Industrial process also represents Clark Manufacturing Co., Texsteam Corp. and Industrial Research & Design, Inc. Hanson has had several years of experience as a project engineer engaged in development work on steam generators and heating equipment.

Collins Soon Will Start Engineering Building

Construction is scheduled to begin soon on Collins Radio Co.'s new $1,700,000 engineering and development building on the firm's 200-acre site in the Richardson, Tex., city limits near Dallas.

James G. Flynn, Jr., vice president for sales and manager of Collins' Texas division operation, said that considerable site preparation and other preliminary work already has been done to get the expansion program under way.

The new building will have a ground floor area of 105,000 sq. ft. and an additional 18,000 sq. ft. in mezzanines and second floors. Engineering activities will be housed in the new facility while manufacturing and other activities not moved to the new building will be expanded into space made available by the move. The company's varied Texas operations now are conducted in 11 sites with a total of 243,000 sq. ft. of space in the Trinity industrial district and at Red Bird airport. Additional facilities are planned at the new Addison airport.

Continental-Emsco's Division Managers Hold Meeting

F. I. Brinegar, executive vice president, distribution, addresses a meeting of Continental-Emsco Co. division managers. The 2-day meeting was held in Dallas at the Baker Hotel.

Goldsby, Hamilton, Lange Named to New CB&I Posts

Fred L. Goldsby, vice president and formerly general sales manager, has been appointed assistant to the president, Chicago Bridge & Iron Co., Chicago. S. C. Hamilton, formerly district sales manager, Houston, has been made a vice president and general sales manager, with headquarters in Chicago. K. W. Lange, formerly with the firm at the San Francisco sales office, has been appointed Houston district sales manager.

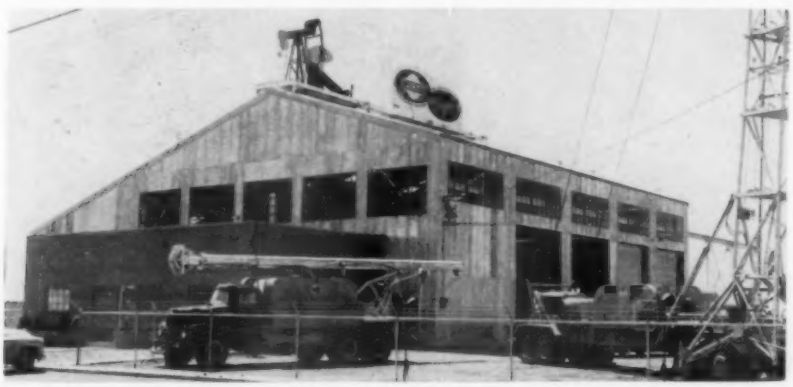
F. L. GOLDSBY

S. C. HAMILTON

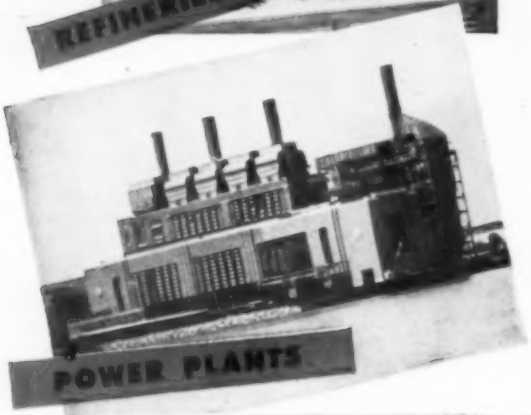
Goldsby, who joined CB&I in 1927, has served in the operating department; as assistant to the chief engineer; in the research department; and as manager of the company's foreign erection department and export manager in New York. He has been general sales manager and a director since 1954.

Hamilton, district sales manager in Houston since 1940, and a director of CB&I since 1946, joined the company in 1928 in the engineering department at Chicago. He was transferred to the engineering department of Horton Steel Works, Ltd., in 1929. He later worked

Franks Division Opens Odessa Sales, Service Center



New district on-the-spot sales and service center for Franks Division, Cabot Shops, Inc., recently opened at Odessa, Tex., with an open house attended by 1,500 West Texas operators. The shop will stock parts for both the Franks line of well-servicing and drilling units and Cabot pumping units. Factory trained service personnel will be on 24-hour duty. The shop is large enough to repair, adjust, or overhaul four Franks units at one time.



RUGGED

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One of the chief reasons why Vogt equipment is used by so many of the nation's key industries is the close working co-operation of Vogt engineers with the customer in determining his requirements. The result is an extraordinary ability to produce mechanical designs which, when translated into the finished product, most economically meet the required needs.

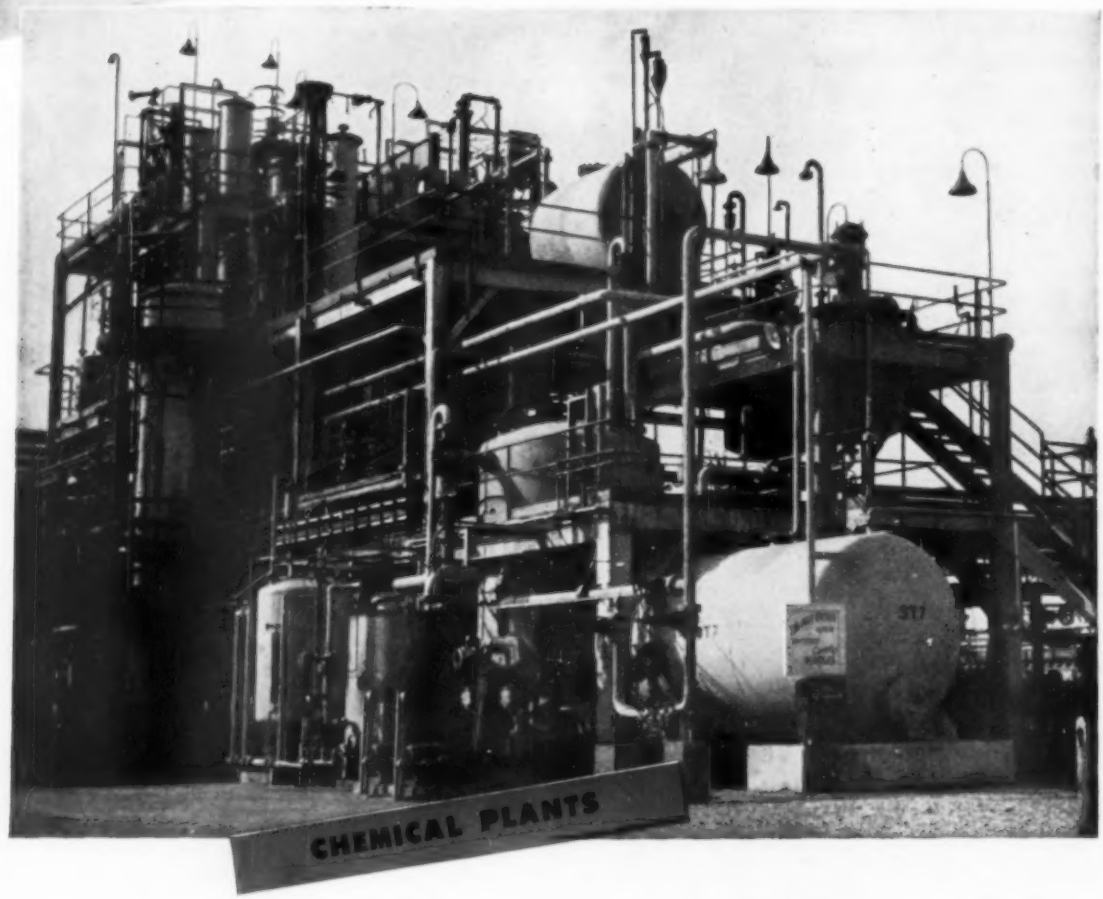
Performance on the job proves, too, that the care and rigid tests and inspections given every Vogt product pay off in low maintenance costs.

Specify Vogt and be sure of equipment which will meet today's toughest service demands.

Write Dept. 24A-GO for catalogs

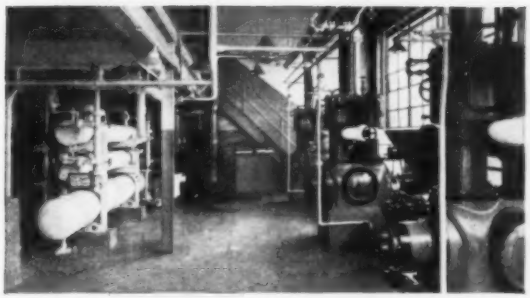
HENRY VOGT MACHINE CO., LOUISVILLE, KENTUCKY

SALES OFFICES: NEW YORK, PHILADELPHIA, CHICAGO, CLEVELAND, ST. LOUIS, DALLAS, CINCINNATI, CHARLESTON, W. VA.



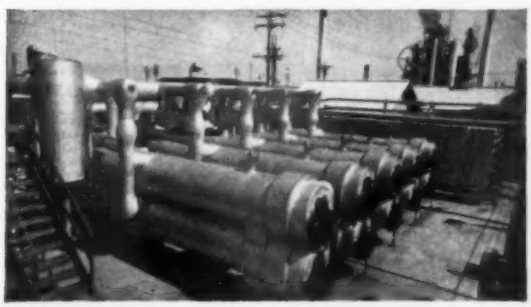
and RIGHT!

used and trusted by the nation's key industries



REFRIGERATION AND ICE MAKING EQUIPMENT

Widely employed in industry for important process work. Compression refrigeration systems, also Tube-Ice units, are available in a wide range of capacities.

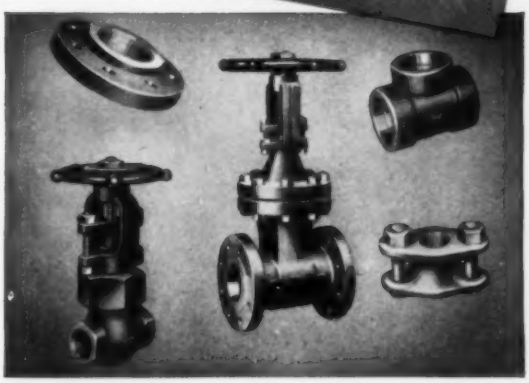


PROCESS EQUIPMENT FOR EVERY SERVICE

Constructed in wide variety to meet all Code requirements. Stills and towers, oil chillers, crystallizers, heat exchangers, molding machines, etc., serve in the manufacture of oils, greases, high octane gasoline, synthetic rubber, chemicals and related products.

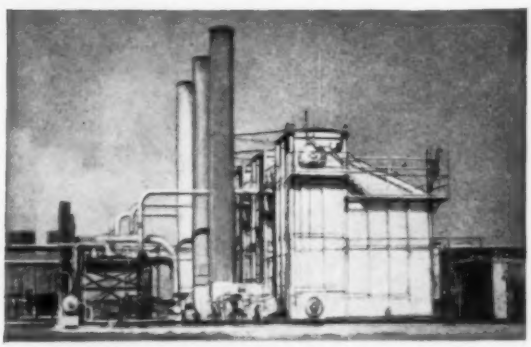
SPECIAL CORROSION RESISTANT MATERIALS

Vogt produces a wide variety of equipment from special metals and alloys to fight corrosion and product discoloration or contamination. Corrosion resistant properties of welds match that of the materials used to construct the equipment.



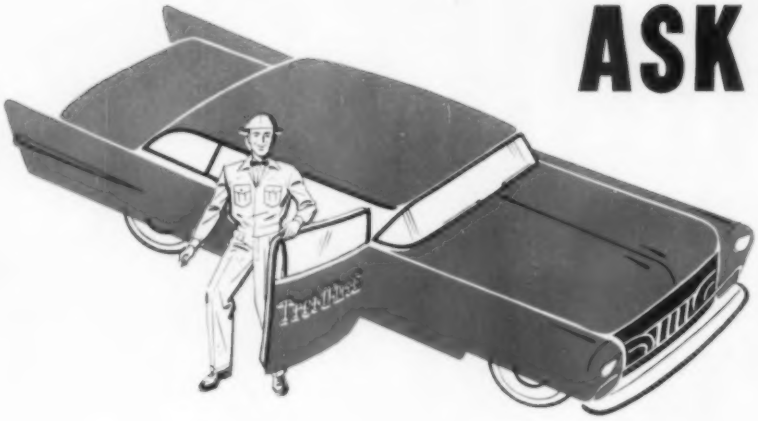
DROP FORGED VALVES, FITTINGS AND FLANGES

Vogt valves, fittings and flanges are drop forged from carbon and alloy steels to safely handle liquids and gases at high pressures, and high temperatures. Complete line includes: flanged, screwed and socket weld end globe, gate and check valves. Also ells, tees and crosses—couplings—bushings—plugs—unions—flanges and flange unions, and welding heads.



MODERN STEAM GENERATORS

Custom built and package type Vogt steam generators give maximum rating in a minimum of space with high efficiency and low maintenance costs. Available in bent tube and straight tube designs for solid, liquid or gaseous fuels, burned singly or in combination to meet every power, processing or heating requirement.



ASK THE MAN IN THE RED CAR

for fast, effective answers to your emulsion, corrosion, scale and similar treating problems

Whenever or wherever you see the Tretolite "Man in the Red Car" you are looking at an assistant for many of your field problems.

Not only is the Tretolite Field Engineer strategically located for your quick availability—he is adequately trained and equipped to recognize and effectively cope with most of your treating problems *right then and there!* His rear-of-car laboratory makes it possible for him to render on-the-spot analyses and suggested solutions for your treating problems.

Further, he is an important link in a well-forged, nationwide chain of men and facilities. He knows that he, in turn, is backed by the extensive research and technical experience of the Tretolite Company—always ready to advise, develop, or even send technical men into the field when necessary.

Why not present your very next field problem to
THE MAN IN THE RED CAR!

Chemicals and Services for the Petroleum Industry

DESALTING • DEMULSIFYING • CORROSION PREVENTING
SCALE INHIBITING • FUEL OIL ADDITIVES
WATER DE-OILING • PARAFFIN REMOVING
METAL CONDITIONERS

TF-57-1

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COMPANY
A DIVISION OF PETROLITE CORPORATION
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Dresser Completes Compression Fitting Plant

Dresser Manufacturing Division of Bradford, Pa., one of the Dresser Industries, Inc., has completed a new million-dollar fitting plant in Wellsboro, Pa.

The new plant, providing 100,000 sq. ft. of manufacturing space, is devoted exclusively to the manufacture of compression fittings for use by equipment manufacturers.

Another phase of Dresser Manufacturing Division's expansion program is taking place at the Bradford plant which has been enlarged by an addition of 33,000 sq. ft. of space.

SSC Moves Southern Division Headquarters

Southern division headquarters of Seismograph Service Corp. have been moved from Tulsa to Houston, according to G. H. Westby, president. Robert B. Baum, assistant vice president, will be in charge of the southern division, with offices in the Texas National Bank Building.

Baum joined SSC in 1941. He worked with field crews and served as party chief and supervisor. He is former manager of SSC's Shreveport, La., office. His work has included operations in the CB&I erection department, the Birmingham, Ala., shop and sales office, and in 1937 was named district sales manager of the Birmingham office.

Lange, who joined the firm in 1941 in the Chicago erection district, later served in the Chicago research department; the Morgan City, La., drydock yard; in the Birmingham engineering department and sales office; the Houston sales office; and since 1947 has been in the San Francisco sales office.

Fischer & Porter Promotes Rice to General Sales Mgr.

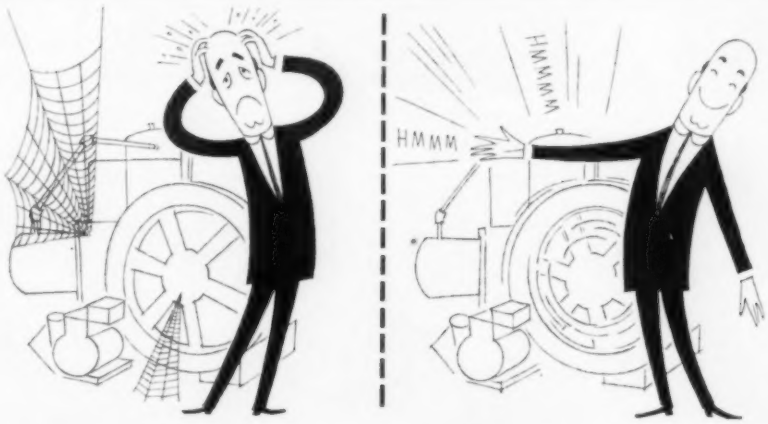
R. L. RICE

Robert L. Rice has been promoted to general sales manager of Fischer & Porter Co., manufacturer of complete process instrumentation. Rice joined F & P in 1950 as a sales engineer, becoming sales manager of the Cincinnati office a year later. For the past 3 years he has been manager of F & P's water and waste division, which manufactures and distributes chlorination equipment. James Haskett replaces Rice as manager of the division.

As general sales manager Rice will direct the sales efforts of all four divisions of the Hatboro, Pa., organization: industrial instruments; data reduction and automation; precision glass; and water and waste.

Walworth Names Luttrell General Sales Manager

Milford H. Luttrell has been named general sales manager of Walworth Co., a leading manufacturer of valves and fittings. Luttrell joined Walworth in 1933. He was appointed assistant manager of the southeastern division in 1944 and made manager in 1949.



HE DIDN'T

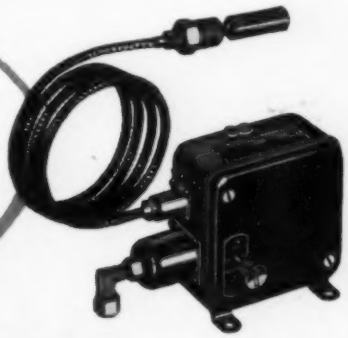
...install a Penn Safety Control on his engine. One day it developed an overheated cooling system while on an important job. Now he's paying costly repair bills and wasting valuable working time.

HE DID

This wise fellow avoided trouble before it started by investing in a Penn Control. One day it warned him of danger when oil pressure dropped too low. The fault was corrected before damage occurred.

MORAL: You'll be money ahead when you choose a Penn Safety Control. It sounds an alarm, flashes a light, or stops engine operation automatically when cooling water overheats or oil pressure drops too low. It gives low cost, dependable protection for new or old engines. See your jobber.

Penn engine safety controls prevent costly loss!



PENN CONTROLS, INC. Goshen, Indiana

EXPORT DIVISION: 27 E. 38th ST., NEW YORK, N. Y.

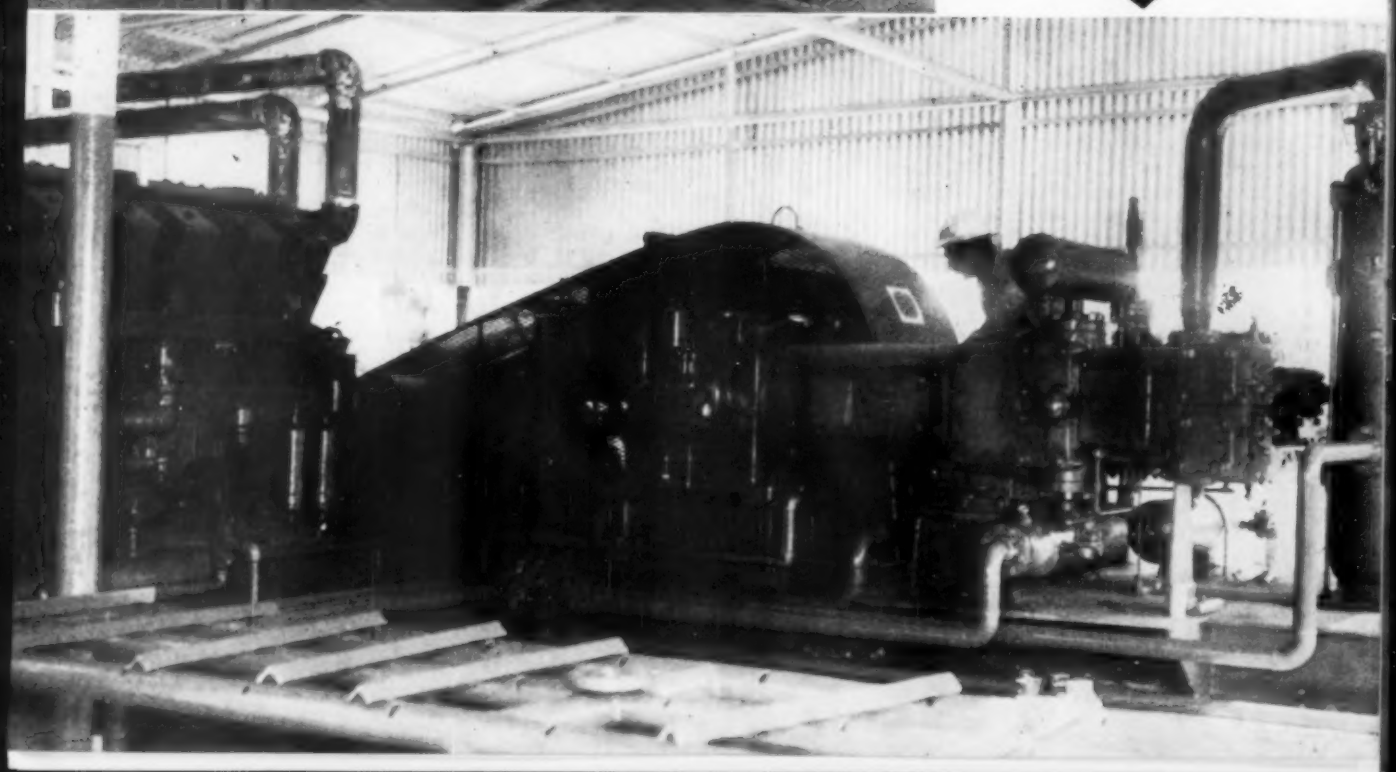
AUTOMATIC CONTROLS FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

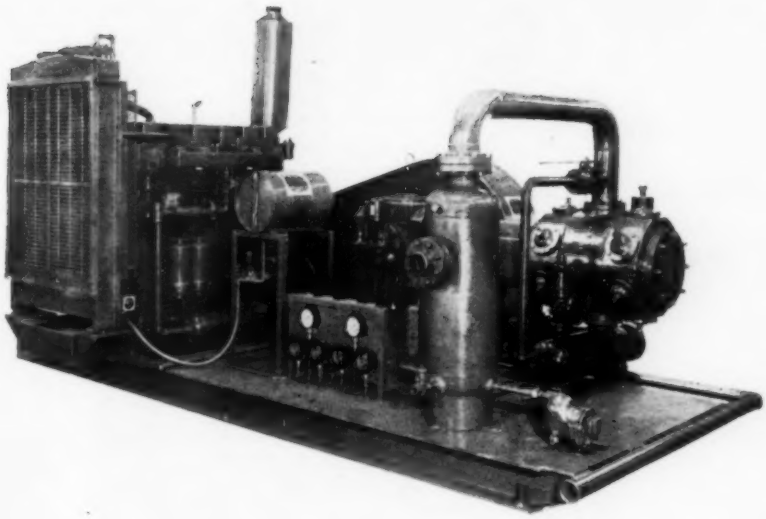
ESH
Packaged Portable
COMPRESSORS

South Texas (McAllen) Area: 150 HP, Single Stage, ESH Wilson Supply-Ingersoll-Rand Compressor Installation. (Sales Gas).

Central Gulf Coast Area: 200 HP, Single Stage, Twin ESI, Wilson Supply-Ingersoll-Rand Compressor Installation. (Gas Lift).

South Louisiana Area: 300 HP Twin ESH, Wilson Supply-Ingersoll-Rand Compressor Installation. (Gas Lift).





Ready for the Field: 150 HP, Single Stage, Low Pressure, ESH, Wilson Supply-Ingersoll-Rand Compressor. (Sales Gas).

Engineered to Cost You Less

The three field installations of Wilson Supply-Ingersoll-Rand Packaged Portable Compressors illustrated on the opposite page emphasize the versatility and adaptability of these outstanding units.

The type "ESH" Compressors are completely new. In them have been incorporated features that assure continuous, low cost operation. They are adequately valved with type "A" CHANNEL Valves with "double life" seats in low and medium pressure cylinders, and the dependable type "K" valves in the high pressure units.

These installations have been engineered to meet specific, individual well conditions—and completely fabricated to give trouble free performance.

These features mean profit and satisfaction to you:

- Completely sealed frame.
- Sealed distance-piece.
- Full-floating aluminum bearings.
- Force-feed lubrication with full flow filter.
- Window-type oil level indicator.
- Low-oil-pressure protection.
- Aluminum crosshead shoes.
- Bored crosshead guide.
- Full-floating metallic packing.

Contact your nearest Wilson Supply Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information, and quotations. Please give suction and discharge pressure and volume to be handled.

"WHAT YOU WANT — WHEN YOU WANT IT"

MAIN OFFICE and WAREHOUSE—1301 CONTI ST.

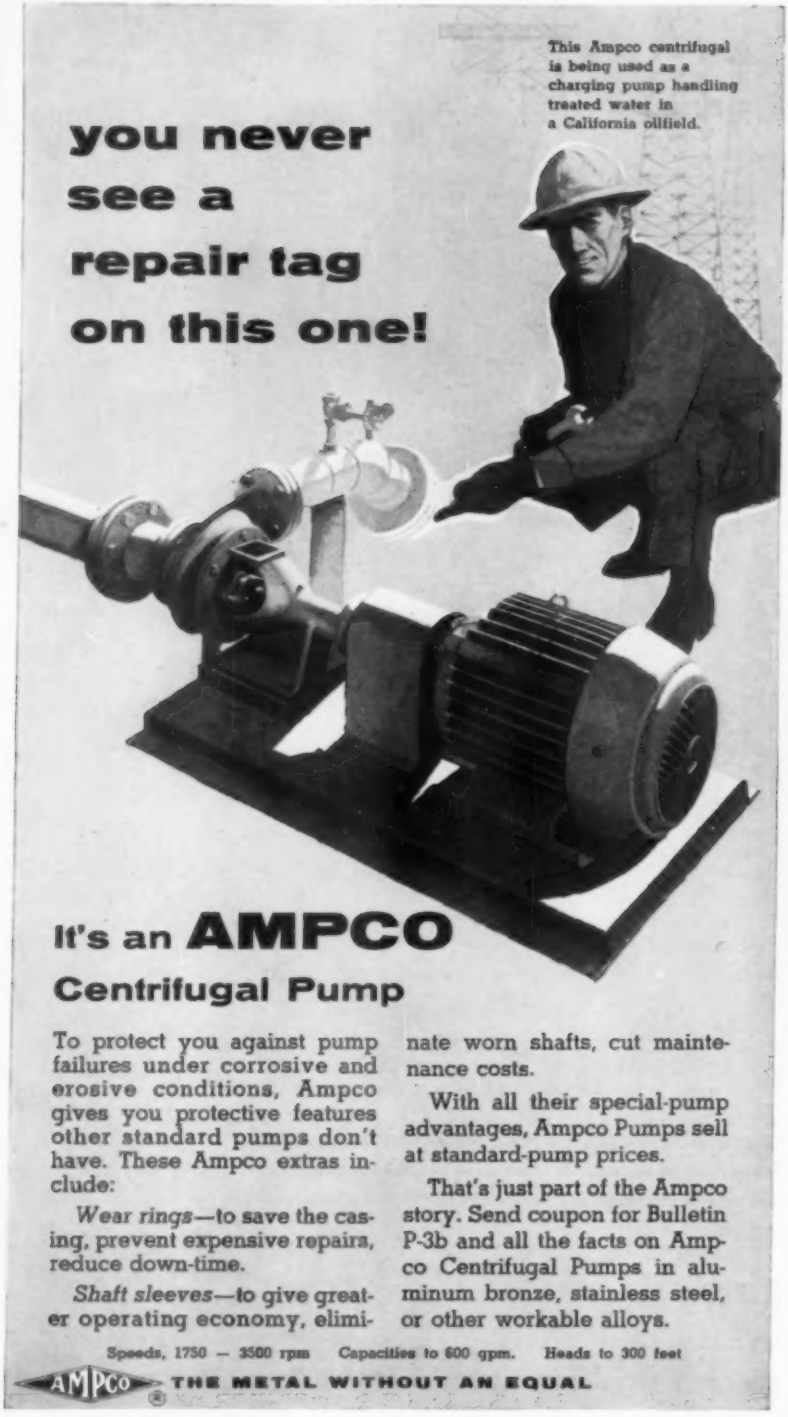
BRANCH STORES

TEXAS: Alice, Corpus Christi, Victoria, McAllen, Bay City, Columbus, Barbers Hill, Liberty, Beaumont, Kilgore, Odessa, San Antonio. LOUISIANA: Lake Charles, New Iberia, Houma, Harvey, Shreveport. NEW MEXICO: Hobbs.

SALES OFFICES

DALLAS SHREVEPORT SAN ANTONIO
TULSA NEW ORLEANS LAKE CHARLES
CORPUS CHRISTI MIDLAND

WILSON SUPPLY CO
HOUSTON, TEXAS


This Ampco centrifugal is being used as a charging pump handling treated water in a California oilfield.
you never see a repair tag on this one!
It's an AMPCO
Centrifugal Pump
To protect you against pump failures under corrosive and erosive conditions, Ampco gives you protective features other standard pumps don't have. These Ampco extras include:
Wear rings—to save the casing, prevent expensive repairs, reduce down-time.
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With all their special-pump advantages, Ampco Pumps sell at standard-pump prices.
That's just part of the Ampco story. Send coupon for Bulletin P-3b and all the facts on Ampco Centrifugal Pumps in aluminum bronze, stainless steel, or other workable alloys.
Speeds, 1750 — 3500 rpm Capacities to 600 gpm. Heads to 300 feet
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THE METAL WITHOUT AN EQUAL

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Bulletin P-3b

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P-39

in offshore work in Canada, the East Coast and in the Mid-Continent, Illinois-Indiana, West Texas and Gulf Coast areas.

Working with Baum as technical supervisor will be E. B. Lindsey, who recently returned to the United States after 10 years abroad as geophysical supervisor for SSC and its foreign subsidiaries.

National Supply Makes Export Division Changes

Charles T. Reichert has been appointed manager of the London office of The National Supply Co. He replaces R. B. Rogers who has retired after 35 years with the company.

C. T. REICHERT

H. C. TAIT

G. L. LINDNER

J. M. DAVIES

Howard C. Tait has been appointed area manager for Venezuela, Mexico, and Alaska. Galen L. Lindner has been named export division engineer, replacing Tait. James M. Davies has been appointed district manager for eastern Venezuela with headquarters at Anaco.

Reichert, who started with the company in 1916, was made sales manager of the California division in 1947. In 1953 he spent considerable time in England and Europe for the export division.

Tait joined National Supply in 1948, served in the California and eastern divisions, was appointed supervisor of personnel training in 1952, and was transferred to the export division as division engineer in 1955. Lindner joined National in 1949. He later did sales work in the Kansas and Oklahoma oil fields and in 1952 was transferred to the export division, where he has since filled several Venezuelan assignments.

Davies started with the company in 1935 at the Mountain View, Calif., store. Various field sales assignments

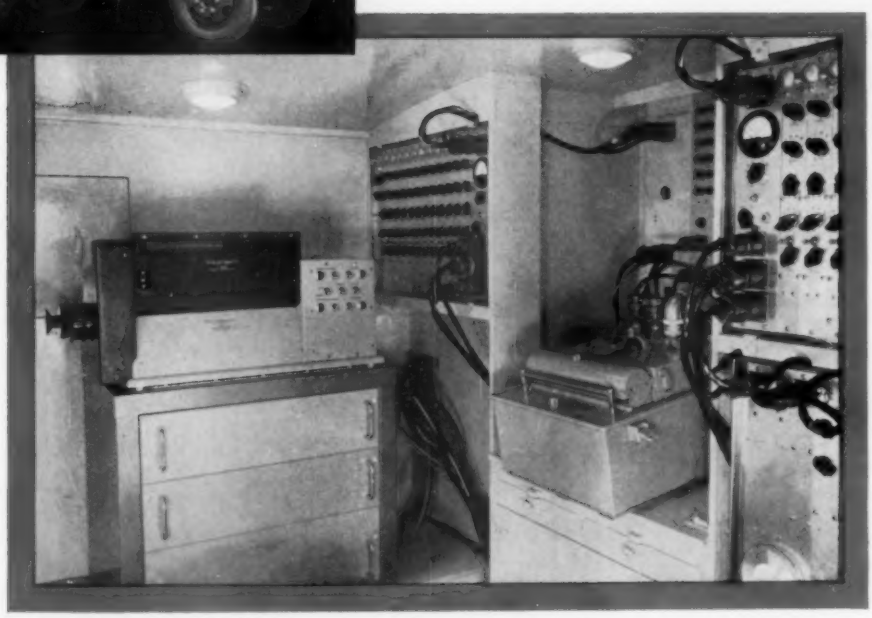
Recognizing that delays in interpretation can sometimes be costly, Petty offers a time saving answer with the "Mobile Vari-Plotter," an on-the-scene data processing laboratory contained in the field recording truck. This magnetic recording unit is capable of quickly producing fully corrected record sections at the site of Petty exploration parties anywhere in the world.

For Today's Exploration

THE FASTEST THING ON WHEELS

Right inside this recording truck, corrections for weathering, elevation and step-out are all applied, and records are timed to a common datum reference in just a matter of hours. Because the "Mobile Vari-Plotter" eliminates the need for central office record processing, your exploration dollar goes farther when using this new Petty service.

Again, Petty's personnel, equipment, methods and experience have teamed up to give you more advanced, economical and rapid exploration service. Put it to profitable use . . . today. Phone, write or call the nearest Petty office.



"Mobile Vari-Plotter" truck carries magnetic recording and complete data processing equipment

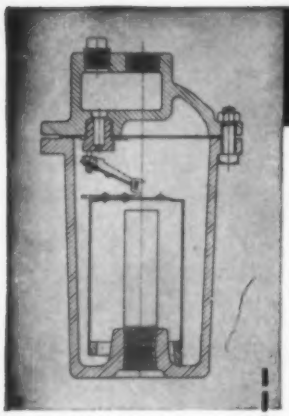
Petty

GEOPHYSICAL ENGINEERING CO.

SAN ANTONIO 5, TEXAS

District Offices: Houston, Tulsa, Casper, Billings, Lafayette, Odessa

SEISMIC GRAVITY MAGNETIC SURVEYS



INVERTED BUCKET TRAPS with light weight buckets for draining light liquids from gases. The same design and operation proved on thousands of steam trap applications.

LIQUID LEVEL CONTROL OF CORROSIVE LIQUIDS?

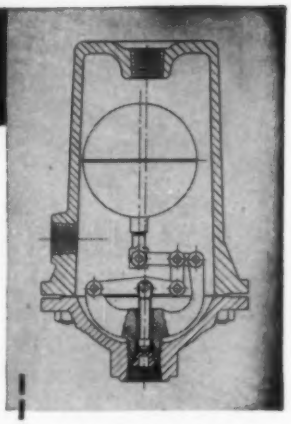
. . . These ARMSTRONG TRAPS are the Maintenance-Saving Answer

ARMSTRONG traps extensively have been used to drain corrosive liquids from receivers and maintain the liquid level at any desired point. Bodies and caps have been furnished of nickel, aluminum-bronze, monel, stainless steel and other metals which can be cast or forged. Working parts, also, have been of nickel, monel, stainless steel or any weldable material available in sheet, rod and bar form.

Traps made of low carbon chrome iron, for example are being used to drain 60% Nitric acid from receivers at 75-100 psig. Perhaps you have a corrosive liquid control problem that can be solved with Armstrong traps. For complete data write:

ARMSTRONG MACHINE WORKS

8682 Maple Street • Three Rivers, Michigan



BALL FLOAT TRAPS with compound or direct lever mechanism for draining water or light liquids from gases or other liquids. Also widely used for air or gas relief service.

ARMSTRONG STEAM TRAPS • AIR TRAPS • GAS TRAPS
AIR RELIEF TRAPS • LIQUID LEVEL TRAPS

OIL MEN CALL US 'BANKERS'. . . but BANKERS CALL US 'OIL MEN'! ! !

You can talk the strange language of Oil with us because we "made up" some of the words! Fifteen of our directors are directly affiliated with the oil industry. We have one of the largest Oil Credit files in the nation; OIL LOAN service that includes oil-wise Trust Dept. counsel. See R. ELMO THOMPSON, R. OTIS McCLINTOCK, RUSSELL F. HUNT, WM. W. MICHAELS, BILL KENDALL or R. H. GWINNER. Remember, in Tulsa . . . in the Middle West . . . it's BOTH pleasant and profitable to . . .

Think 1st of Tulsa

FIRST NATIONAL BANK & TRUST CO.

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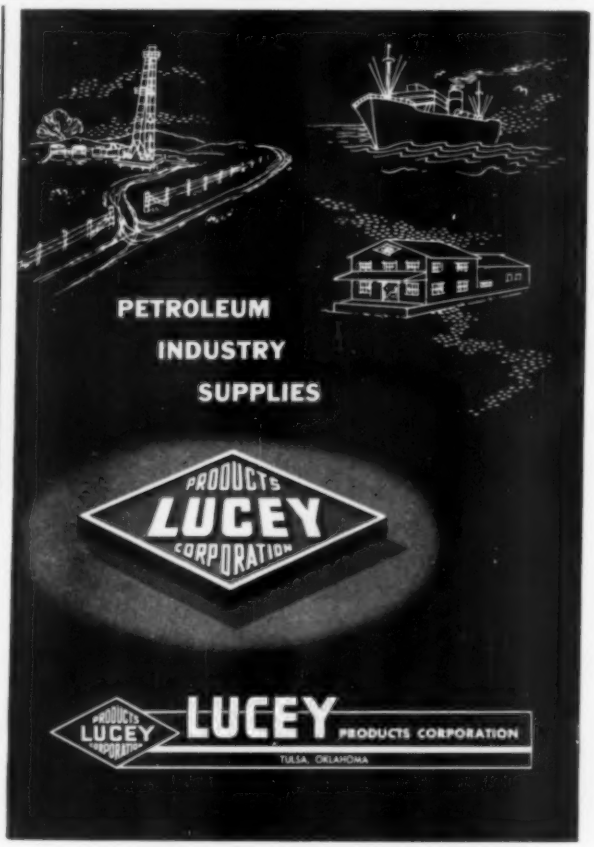
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION



at Avenal, Kettleman Hills, and Coalinga were followed by his appointment as manager of the San Joaquin Valley district in California early this year.

Blaw-Knox Names Assistant Manager, Petroleum Dept.

George F. Kline has been promoted to assistant manager of the petroleum department of Blaw-Knox Co., chemical plants division. This department renders complete engineering and construction services to the petroleum industry.

Kline came to Blaw-Knox in 1954 with varied experience in petroleum, petrochemical and chemical development and design work. For the previous 3 years he had been chief process engineer of Vulcan Engineering Division, Cincinnati, Ohio. Prior to that, he was connected with Stacey Bros. Gas Construction Co. and Hydrocarbon Research, Inc.

Oilwell Names Four to Central Midwest Posts

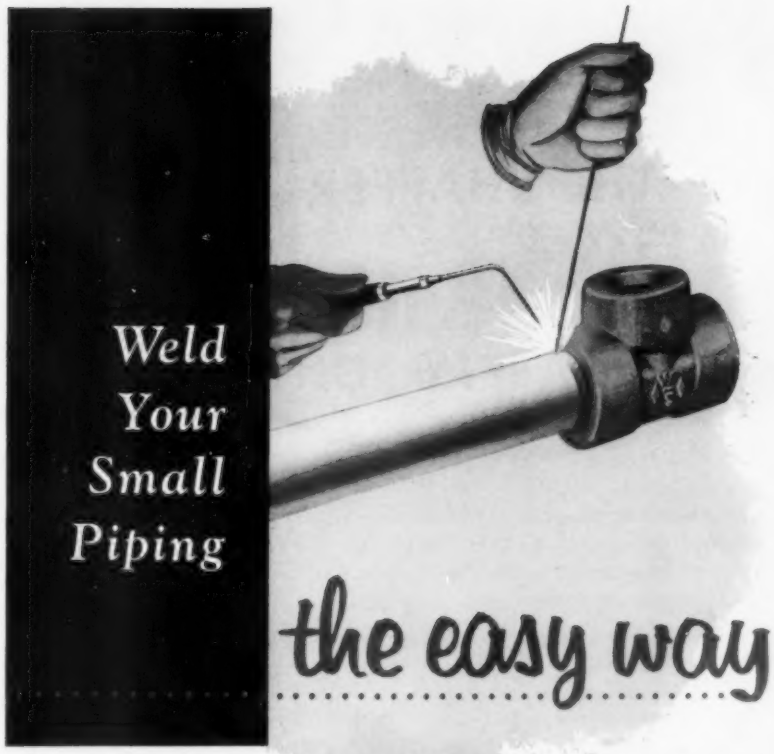
Appointment of Donald L. Davis and Henry T. Fillion as United States Steel Corp.'s Oil Well Supply Division assistant district engineers, machinery and equipment sales and service, at Abilene and Odessa, Tex., has been announced by William Miskimins, Central Midwest area manager of the division. Ellis C. Langford, Jr., has been named field representative at Snyder, Tex., and Raymond F. Steward, field representative, has been transferred from McCamey, Tex., to Odessa.

Davis was employed by Oilwell in 1956 as junior engineer at Big Spring, Tex. Fillion joined the division in 1956 as junior engineer at Anson, Tex. Prior to his employment in 1956, Langford had 6 years' oil-field supply experience. Steward was employed by Oilwell in 1954 at McCamey and was appointed field representative at that location in 1955.

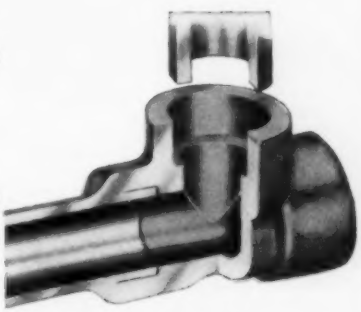
Beal Named Agent for Walker Well Heads

Beal Equipment Co. of Odessa, Tex., has been appointed manufacturers agent for Walker Well Heads, Inc., of Tulsa for the West Texas and southern New Mexico area. Walker Well Heads, which was formed in 1950 by D. C. Walker, manufactures casing and tubing heads.

Beal has offices in Midland and



with W-S Socket-Welding Fittings



You can cut welding costs . . . and get clean, pressure-tight joints in small diameter pressure piping with W-S socket welding forged steel fittings. Welding is easy and quick. Deep sockets help support and align the pipe. Outside-the-pipe fillet weld means no welding icicles inside the pipe . . . and no need for backing rings. W-S Socket-Welding Fittings are available in sizes ⅛″ to 4″ in 2000, 3000 and 6000 lb. pressure classes. For resistance to high temperatures and corrosion W-S socket-welding fittings can be obtained in 3 chrome-moly alloy steels and in types 304, 316 and 304 ELC stainless steel. For detailed information write to W-S Fittings Division, H. K. Porter Company, Inc., P. O. Box 95, Roselle, N. J.

HKP W-S FITTINGS DIVISION
H. K. PORTER COMPANY, INC.

Two-way Safety FOR FISHING, TESTING AND DIAMOND CORING OPERATIONS...

THE SHAFFER Oil-Sealed JAR SAFETY JOINT

. . . a two-purpose tool — *Up-Jar* and *Safety Joint* — in which all operating parts are sealed in oil — permanently protected against mud, sand and corrosion! Here are the highlights:

The Shaffer Oil-Sealed Jar Safety Joint offers all the "two-tools-in-one" features—and the many other advantages of the original Jar Safety Joint first developed by Shaffer years ago. It can be used in testing, fishing, diamond coring or other operations to deliver a sharp upward blow for freeing the string whenever it becomes stuck . . . and, as a Safety Joint, can be readily released in the event the string cannot be loosened.

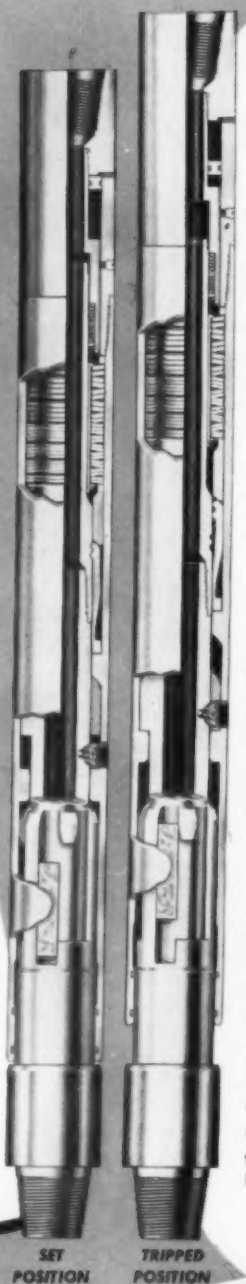
Both these operations—Jarring and Releasing—are performed under the positive control of the operator, and either action can be selected at his discretion.

MECHANISM COMPLETELY OIL-SEALED

To protect the mechanism against the corrosive and abrasive actions of mud, sand and grit, all operating parts are now sealed in a chamber filled with clean oil. At even the greatest depths and highest fluid pressures, this oil-filled chamber prevents the drilling mud from contacting the internal mechanism of the Jar Safety Joint because the oil in the chamber automatically "balances" the varying hydraulic pressures in the well so that packing units are not subjected to excessive pressure differentials.

Result . . .

1. There is no change in "tonnage trip-off" or other characteristics as operating depths increase.
2. Abrasive mud, sand and grit—corrosive chemicals and salts—never contact the operating mechanism. This assures longer life, negligible maintenance.
3. The packing, not being subjected to excessive pressure differentials, lasts much longer and remains leak-proof at even great depths.



SET POSITION — TRIPPED POSITION

Other important advantages

In addition to its Oil-Sealed design, these advantages are also typical of the Shaffer Oil-Sealed Jar Safety Joint . . .

- Jarring action is automatic and positive. To deliver a sharp upward blow, it is only necessary to raise the string until tension is equal to the pre-set tripping load of the tool, whereupon the blow is struck. Lowering the string again re-sets tool for another blow—and repeated blows can be struck as fast as the string can be raised and lowered.
- Only *straight pull* is necessary to operate the tool. No torque or other secondary operations are needed—particularly important on fishing, testing and similar strings where light connections are used.
- The force of the blow is absorbed by integral knocker heads built into the tool—not by easily-damaged drive-keys or threaded elements.
- The Shaffer Oil-Sealed Jar Safety Joint does not depend upon friction for its tripping action. Therefore the tool is not subject to variable operating characteristics. Its action is dependable, uniform, fool-proof!
- The Safety Joint portion has important advantages over conventional safety joints. No threads are used in the releasing mechanism—therefore there's no risk of overtightening by torque. Nor is there risk of accidental release by reverse rotation. Yet when simple releasing procedure is followed, *the tool releases with less than ¼ turn at the tool!*

There are many other advantages. Get the full story by sending for booklet at lower left.

Get The Complete Story **on this important Shaffer advancement by sending for this 8 page descriptive booklet. It contains cutaway views of the tool showing the oil-sealed construction and explaining how the tool operates without depending upon friction for tripping . . . gives application details for the tool . . . full dimensions of the various tool sizes, together with exploded views of parts, etc.**

Or see our nearest Shaffer representative for details.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops; Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Shaffer Tool Works, 6201 South Shields Boulevard
FARMINGTON, NEW MEXICO, Shaffer Tool Works, Post Office Box 546
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U. S. A.

34 years OF OIL TOOL LEADERSHIP

Odessa and warehouse facilities at Odessa. The firm, headed by Walter Beal, engages primarily in sales and service of production equipment.

Buffalo Industrial Supply Moves Office, Warehouse

Buffalo Industrial Supply Co. has moved its office and warehousing facilities to 3325 Yellowstone, Houston. The new location includes company offices, warehouse and pipe yard. The company deals in industrial piping and supplies for the oil field, pipeline, refinery and petrochemical industry.

Officers of the firm are Norbert H. Acuff and Ed Mather, Jr., co-owners.

Dowell Reorganization of Three Districts Completed

Dowell Incorporated has completed the reorganization of its three eastern U. S. districts, according to A. C. Polk, general manager, Tulsa. The area includes all of the states east of the Mississippi River except Michigan. Polk said the reorganization will result in more efficient operation, better customer service and sales coverage.

All of Dowell's industrial services east of the Mississippi River, except Florida, will now be handled from the Cleveland district office. All oil-field services, except for Michigan, will be managed from Salem, Ill. Florida industrial chemical services and sales activities will be supervised by the Houston office. The Michigan area will continue to be managed from its Mount Pleasant district office. The Ardmore office has been closed and its personnel transferred to Mount Holly, N. J., where Dowell has recently completed a service and sales headquarters.

The Cleveland district office will continue to be supervised by E. C. Hardy. I. R. Bielek has been transferred from St. Louis to be district operations manager at Cleveland. L. J. Kutlich will continue as manager of the Salem district with J. R. Paul of Carmi as district operations manager. J. H. Adkison, formerly manager at Ardmore, has been transferred to Dowell's general offices in Tulsa where he is now assistant to D. E. Ramsey, manager of operations.

Adkison joined Dowell at Great Bend in 1936. He has served the company in various capacities at Seminole,

VAPOR PHASE® LENGTHENS ENGINE OVERHAUL LIFE

From 8,500 Hrs. to 25,000 Hrs. For Tidewater Oil Company

At the Hartman Lease Gas Compressor Station of the Tidewater Oil Co., Ventura, Calif., seven engine-compressor units are in operation: 1-150 bhp unit and 6-300 bhp units. The Vapor Phase installation includes a patented single Steam Separator, condensate unit, crude oil heater and steam turbine driven fan condensers.

Before Vapor Phasing, complete engine overhauls were required after 8,500 hours. Now the overhaul period has been extended to over 25,000 hours! Ring sticking is practically nil and carbon deposits are negligible.

The 5850 lbs. steam/hr. produced by the engines is now used to heat crude oil to help separate water and sludge from oil, and to heat workmen's change room. A Vapor Phase crude oil heater has replaced gas-fired oil treaters. The cooling tower used to cool engines has also been completely eliminated.

Thermal Circulation in all engines is accomplished by one large Vapor Phase unit, thus eliminating water pumps.

WRITE for full story on Vapor Phase economy —for your installation.

"Sole Developers and Manufacturers of Vapor Phase® Thermal Circulation (Ebullition) Engine Cooling Systems."

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ENGINEERING CONTROLS Inc.

An Affiliate of St. Louis Shipbuilding & Steel Co.

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2 ways to get a tighter tank *faster*

1. Specify Bolted Steel Tanks

MASTER-CRAFTED BY COLUMBIAN SINCE 1893

2. Call your nearest COLUMBIAN Distributor!

Tank crews can tell you that you can't beat Columbian Bolted Steel Tanks for tightness and fast erecting time. That's because these master-crafted, precision made Columbian tanks just "fit up" better . . . and Columbian supplies the most modern gasket and moulded joint materials for quick, tight construction.

There's still another way to speed up that tank you need right now. That's to call your nearest Columbian Distributor, listed below. He'll have the size tanks you want quickly available at your site.

COLORADO

O'Neill Tank Co.
Sterling, Colo.

KANSAS

O'Neill Tank Co.
P. O. Box 771
Great Bend, Kans.

Hays, Kans.
Hill City, Kans.
Meade, Kans.

LOUISIANA

McGuffin Tank Co.
P. O. Box 724
Shreveport, La.

McClatchey Tank & Supply Co.
Lafayette, La.

NEW MEXICO

Allied Supply Co.
P. O. Box 217
Artesia, N. M.

American Tank & Steel Co.
P. O. Box 1177
Farmington, N. M.

TEXAS

Gray-Brown Tank Co.
P. O. Box 924
Longview, Texas

Mapp Tank Co.
P. O. Box 1349
Odessa, Texas

Martin Tank Co.
P. O. Box 135
Corsicana, Texas
Kilgore, Texas

Federal Tank Co., Inc.
First State Bank Bldg.
Bellaire, Texas

Texas Gulf Tank Co.
P. O. Box 14281
Houston, Texas

TEXAS (Contd)

Westex Tank Co.
P. O. Box 941
Odessa, Texas

Columbian Steel Tank Co.
(warehouse)
3705 McKinney Ave.
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B. A. Box
P. O. Box 42
Beeville, Texas

CANADA

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Want to know more about what makes tanks tight? Send for this most unusual handbook of valuable information and specifications. IT'S FREE!

STEEL—Mastercrafted by Columbian . . . First for Lasting Strength

Okla.; Hobbs, N. M.; Midland, Tex.; and Tulsa.

W-K-M Names B. R. Doak as Manager of Canadian Sales

B. R. DOAK

Barney R. Doak has been appointed manager of Canadian sales and service for W-K-M, division of ACF Industries, Inc., according to B. J. Gross, vice president of marketing. Doak, who was formerly with Parkersburg Rig & Reel Co. as a sales engineer, will cover the expanding oil and gas industry in Canada. He will headquarter in Calgary.

Schlumberger Names Four to Managerial, Sales Posts

D. M. Murphy has been appointed manager of the special offshore operations section at Ventura, Calif., by Schlumberger Well Surveying Corp.

D. W. Stinger has been named manager of the Borger, Tex., location and J. D. Matlock, formerly manager at Borger, is now manager at Shawnee, Okla.

W. T. Wilson has been named senior sales engineer for the western Canada division at Edmonton, Alta.

SIE Appoints Smith as General Sales Manager

F. C. SMITH, JR.

Frank C. Smith, Jr., has been named general sales manager of Southwestern Industrial Electronics Co. of Houston, one of the Dresser Industries, according to Harry J. Girard, vice president. Smith joined SIE in 1953 as a member of the test instrument sales department. He was named assistant sales manager in 1954. Smith was a member of the geophysical research department of Humble Oil & Refining Co. prior to joining SIE.

A. O. Smith Appoints Kunz Casing Products Sales Mgr.

J. E. Kunz has been named casing products sales manager for A. O. Smith Corp., reporting to T. H. Creden, general sales manager for the company's tubular division. Kunz will continue to headquarter in Houston, where

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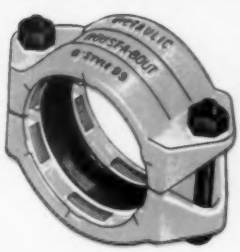
METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

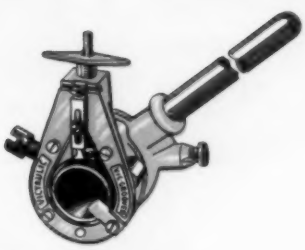


VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS
For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 12".

VICTAULIC SNAP-JOINTS
The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB



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Elbows, Tees, Reducers, Laterals, *a complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".

VIC-GROOVER TOOLS
Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. E-7

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There are special advantages for you "locating" at Texas National Bank. The people are eager to do business and they have real savvy when it comes to the oil industry.

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OF HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

SOME THINGS WE CAN'T SEPARATE

BLOOD FROM A TURNIP

But WE CAN SEPARATE

OIL • LIGHTENDS • MIST
SLUGS • CARRYOVER
FROM
GAS • STEAM • VAPOR • AIR

We can't get blood out of a turnip, but we can separate just about anything you can name from any gas or vapor. Patented Anderson Hi-eF Purifiers are different from ordinary mist extractors, scrubbers and separators. They're virtually 100% efficient and yet contain no moving parts, costly filters, or mesh screens. Each unit is individually guaranteed. Ask us to show you what we can do for you.

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Please send your purification booklet without obligation.

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he formerly was assistant regional sales manager for the division. He has been with A. O. Smith since 1948.

Beré Named President of Axelson Manufacturing

JAMES BERE

James Beré has been named president of Axelson Manufacturing Co., according to John I. Snyder, Jr., chairman of the board and president of U. S. Industries, Inc. Axelson is a division of U. S. Industries. Beré joined Clearing Machine Corp. in 1946 and later became general manager of its Hamilton, Ohio, plant. Clearing was acquired by U. S. Industries in 1954. In 1956 Beré was transferred to the Axelson division, serving as general manager until the present time.

Axelson Manufacturing Co. is one of 13 divisions of U. S. Industries. With plants in St. Louis, Mo., and Montebello and Los Angeles, Calif., it produces oil-field pumping equipment and sucker rods, heavy-duty engine lathes, aircraft components and special machine tools.

Van Arsdale Named Vice President by Jensen

VAN ARSDALE

L. R. Van Arsdale has been appointed vice president of Jensen Engineering Co., Tulsa, according to A. C. Jensen, president.

Van Arsdale has been sales manager of the company for the past 2 years and will continue in this capacity. His further duties will include expansion of the present line of tank mixers manufactured and sold by the firm and introduction of new products currently being designed.

The company recently moved into new offices and plant on Garnett Road with increased facilities for carrying out this expansion program.

McCullough Announces Eastern Personnel Changes

Roy Neal Collum, formerly McCullough Tool Co.'s district sales manager in the Illinois basin with headquarters at Olney, has been transferred to Tulsa to serve as sales representative in the area. Branch Manager Wayne Clark

The welcome mat is always out at your **UNITED SUPPLY** store

Any time, day or night, your UNITED SUPPLY store folks will welcome your call or visit. And no drilling rig or producing lease is out of reach of FAST UNITED delivery. So use the UNITED SUPPLY welcome mat . . . get the dependable parts, service or equipment you need, when you need them . . . contact the courteous people at your nearest UNITED store, 22 locations in 5 states . . . they're your supply friends.

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COURTESY • SERVICE • DEPENDABILITY

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Stores in: KANSAS, OKLAHOMA, TEXAS, LOUISIANA, AND NEW MEXICO

COURTESY • SERVICE • DEPENDABILITY

REPORTS OF PERFORMANCE

from users during the past 16 years show that Kennametal* lasts 20 times longer than steel and 3 to 5 times longer than special and super alloys.

• A Texas producer reported sand abrasion forced a pulling job every 14 to 20 days. After 448 days on the job, Kennametal Balls and Seats showed no wear when well was pulled for other than valve job.

INDUSTRY AND **KENNAMETAL** ...Partners in Progress

Kennametal API Balls and Seats are available at repair shops of most major pump manufacturers. Ask your service man to standardize on them. They'll cost you less in the long run. KENNAMETAL INC., Latrobe, Pennsylvania.

*Kennametal is the Trademark of a series of hard carbide alloys of tungsten, tungsten-titanium and tantalum.

DESIGNED, TESTED AND PROVEN IN THE OIL FIELDS

Screened Air Port

Unexcelled . . . for Outdoor Use

- DRIP PROOF
- VERMIN PROOF
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- CORROSION RESISTANT
- FORCED AIR COOLED

All these features of Fieldmaster Ball Bearing Motors have been designed to overcome the rugged conditions of Oil Field requirements.

CHECK THESE OUTSTANDING ADVANTAGES.

Heavy Cast base for alignment, stability, heavy duty, double-shielded, prelubricated bearings, reduces lubrication worries, high grade silicon steel in the magnetic circuit reduces iron losses . . . Wide variety of windings provides triple ratings, dual voltages . . . high torque licks heavy starting problems. High slip is available to take care of reciprocating load requirements encountered in pumping.

FIELDMASTER

Write For Descriptive Literature.

BETHLEHEM SUPPLY CO. TULSA, OKLAHOMA

Manufactured by VALLEY ELECTRIC CORPORATION, St. Louis, 8, Mo.

has been transferred from Shreveport, La., to Odessa, Tex.; N. G. Whisenhunt, sales representative, formerly at McCullough's Odessa branch, has been transferred to Monahans, Tex.; and J. E. Boatright, former branch manager at Farmington, N. M.; has been transferred to Snyder, Tex., where he will serve as branch manager.

Thermoid Appoints Allen Director Sales, Marketing

R. F. ALLEN

Raymond F. Allen has been appointed vice president and director of marketing and sales, according to Warren E. Hill, president of Thermoid Co., Trenton, N. J. Allen will supervise all sales activities of Thermoid's multiplant operation.

Prior to joining Thermoid, Allen was vice president of sales at Stansteel Corp. He has also been associated with Brewster Aeronautical Corp.

Duff-Norton Promotes Krueger to Sales Manager

T. W. Krueger has been promoted to sales manager by Duff-Norton Co., a leading producer of industrial jacks and hoists.

Krueger will be in charge of all sales for the jack and Coffing hoist divisions, including foreign as well as domestic sales. He formerly was sales manager of Duff-Norton's jack division, a position he held since January 1957. He joined the company in 1947 as advertising and sales promotion manager and later served as assistant sales manager.

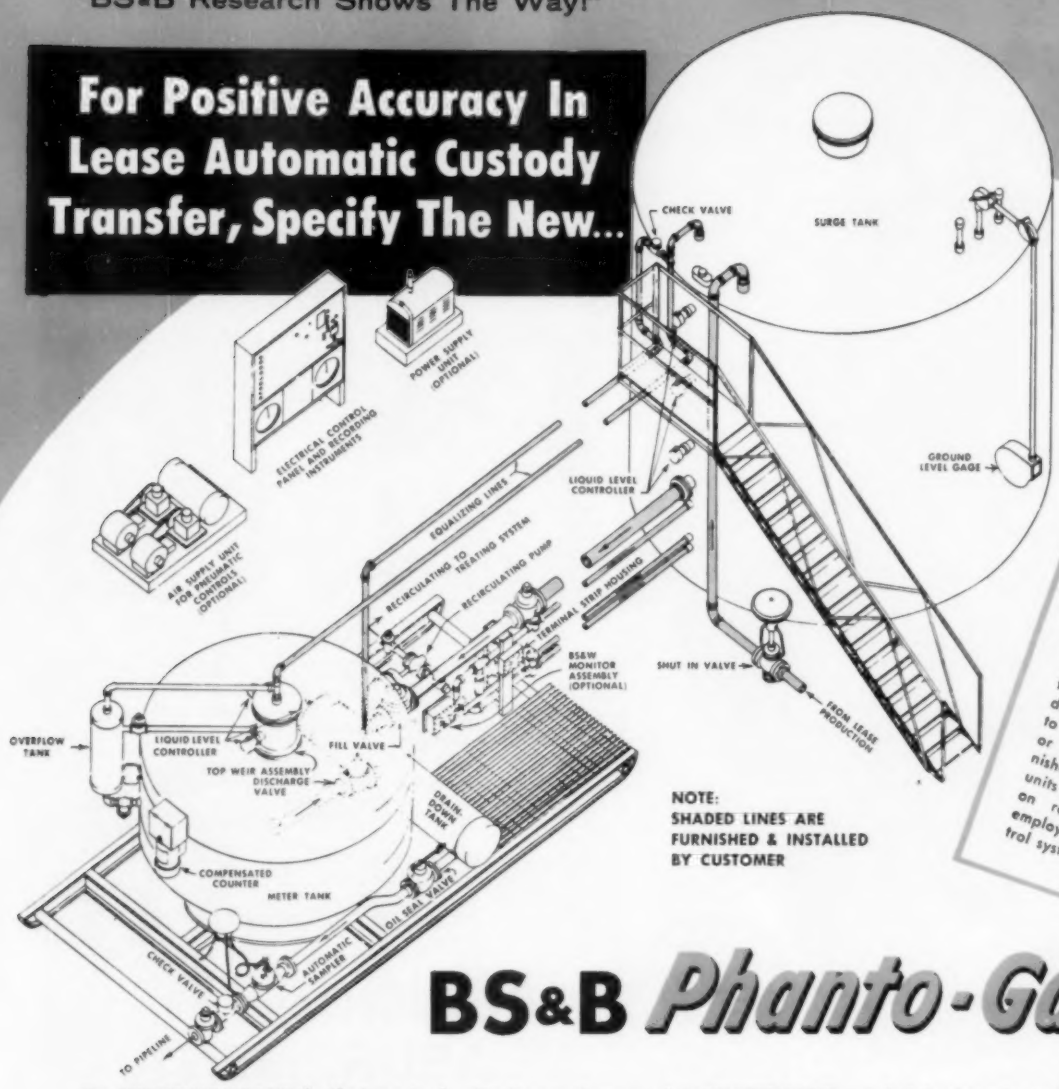
Yuba Buys Heat Exchanger Division of Lummus Co.

The Lummus Co., engineering and construction firm, has sold its Heat Exchanger Manufacturing Division, with plant located at Honesdale, Pa., to Yuba Consolidated Gold Fields. According to J. F. Thornton, president of Lummus, this move allows the company to concentrate on its main activities — engineering and construction.

Yuba plans to continue operation of the Lummus Heat Exchanger Division business. George Worn, who has been

"BS&B Research Shows The Way!"

For Positive Accuracy In Lease Automatic Custody Transfer, Specify The New...



NOTE:
SHADED LINES ARE FURNISHED & INSTALLED BY CUSTOMER

PHANTO-GAGER VOLUMETRIC METER TANKS ...are available as standard in 25 and 50 bbl. sizes, but larger tanks capable of handling production of up to 1,000,000 bbls./day or over can be furnished. Smaller sized units are also available on request. All units employ standard control systems throughout.

BS&B *Phanto-Gager!*

The BS&B PHANTO-GAGER is that part of BS&B's new PHANTO-MATIC Lease System which automatically performs all the functions normally required to accomplish Lease Automatic Custody Transfer. It will:

1. Automatically measure and record temperature compensated oil volume in bbls.
2. Automatically measure (or automatically sample and subsequently determine) oil quality and contaminants.
3. Automatically run crude oil from a lease into connecting pipeline in accordance with predetermined schedules (if required) on an unattended basis.

The Extreme Accuracy of the PHANTO-GAGER is such that the purchaser or his agent is assured of receiving the *exact* amount of gross oil indicated by each recorded run because:

1. The upper weir on the meter tank and the degassing time when the oil is above the weir on filling are designed to give a positive high level gage.
2. The use of a valve between the meter and the drain down tank, plus a set drain down time, gives a positive low level gage.
3. The accuracy of measurement is not affected by the speed of valve action.
4. The meter tank and lines included in the calibrated volume are free of gas traps while filling, liquid traps while emptying.

Fail Safe Controls on The PHANTO-GAGER insure that no oil will be lost in case of power failure because:

1. The fill and empty valves on the meter tank are electrically interlocked.
2. Oil cannot be introduced into the meter tank after the measuring cycle has started, nor can oil be removed from the meter tank (other than to the pipeline) after the top gage has been made and before the run is completed.
3. All electrical controls, motors, instruments and wiring within 150 ft. of the meter and surge tanks are explosion proof.

Together, the BS&B PHANTO-GAGER and the BS&B PHANTO-PUMPER (which automatically performs all lease operations ahead of the PHANTO-GAGER) make up the complete BS&B PHANTO-MATIC Lease System. This gives the lease operator full automation from the wellhead to the pipeline. Ask your BS&B Man to give you full details, or write to...

EFFICIENCY OVER 60 YEARS BS&B RELIABILITY
ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

BLACK, SIVALLS & BRYSON, INC.
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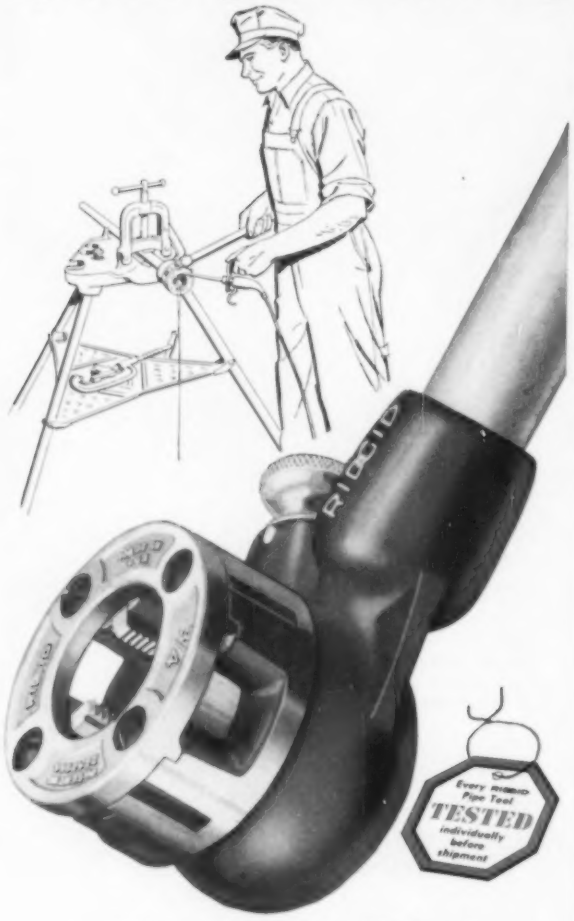
...No Equal for Quick Pipe Threading



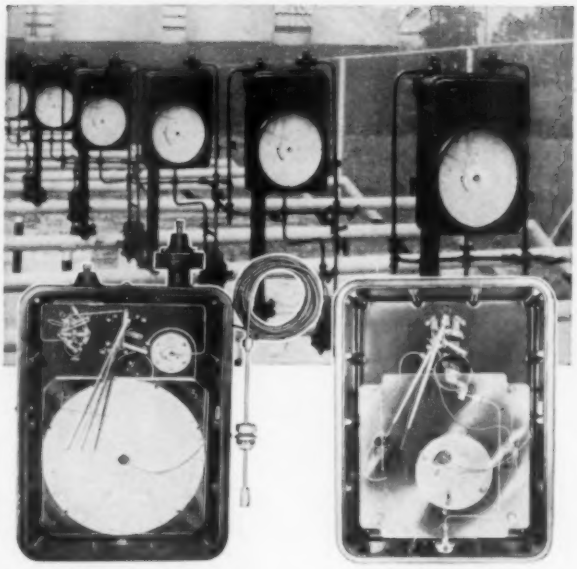
...these handy efficient

RIDGID Drop-Head Dies

A die head for each size, ⅛" to 2"—they snap into ratchet ring from either side, can't fall out—reverse for close threads. Tough malleable and steel heads, famous RIDGID long-wear dies—conduit or special dies available. OOR and OR, ⅛" to 1"; 111R and 11R, ⅛" to 1¼"; 12R, ⅛" to 2". Bargains in fast easy threading—at your Supply House.

The Ridge Tool Company • Elyria, Ohio, U. S. A.

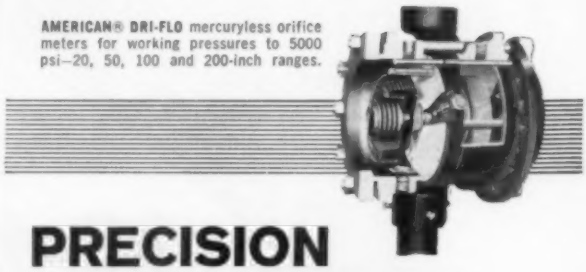
RIDGID
Work-Saver Pipe Tools



AMERICAN-WESTCOTT Series A-88 recording orifice meters for flow, pressure and temperature measurement—working pressures to 5000 psi—10, 20, 50, 100 and 200-inch ranges.

CANNON METER PENS for recording meters, available if desired, provide clear, legible chart records—hold up to a year's supply of ink.

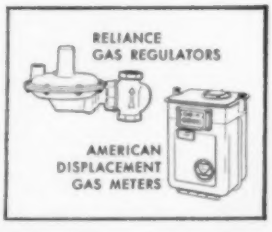
AMERICAN® DRI-FLO mercuryless orifice meters for working pressures to 5000 psi—20, 50, 100 and 200-inch ranges.



PRECISION MEASUREMENT

of flow, temperature, and pressure on one chart

Wherever precision measurement and economy of operation are required; at high or low flow rates, at varying temperatures, whether in recording, indicating, integrating or telemetering models, American orifice meters are synonymous with accurate, dependable, trouble-free service and low maintenance costs.



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INCORPORATED (ESTABLISHED 1836)

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SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters Instruments • Reliance Regulators • Apparatus • Valves

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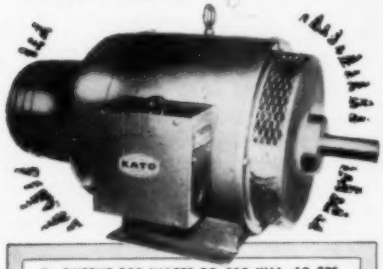
A.C. GENERATORS
ADAPTABLE TO
ANY INDUSTRIAL ENGINE!

★ BUILT TO RIGID ENGINEERING STANDARDS WITH ONLY THE HIGHEST QUALITY MATERIALS USED THROUGHOUT!
★ EXTRA HIGH OVERLOAD CAPACITY!
There is a size in the KATO line to meet the most exacting requirements of the oil and gas industry. Adaptable to any engine of your choosing by means of Kato's flexible couplings and bell housing adapters.



- OUTPUT-350 WATTS TO 500 KVA. 60 CPS.
- 400 CYCLE LINE TO 250 KVA.
- SINGLE BEARING, STANDARD TWO BEARING OR TWO BEARING CLOSE COUPLED.

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Builders of Fine Electrical Machinery Since 1928
KATO Engineering Company
1496 FIRST AVE. MANKATO, MINNESOTA

Completely Air-Conditioned
Centrally Located
Adjacent Garage

BUSINESS and PLEASURE
in TULSA means . . .

THE MAYO
LD 381 TULSA's world-famous HOTEL

with Lummus many years, will be actively associated with Yuba in this operation. For Yuba this is an expansion in the field of heat transfer equipment manufacture presently carried on by its subsidiary, Yuba Industries, Inc. The name of the parent company will be changed to Yuba Consolidated Industries, Inc., with headquarters in San Francisco.

Danielson Named Houston Manager by Midwestern

C. G. DANIELSON

Carl G. (Dan) Danielson, formerly with Midwestern Engine & Equipment Co., Tulsa, has been named manager of the Houston branch of Midwestern Pipe Line Products Co., according to John H. Wilson, vice president and sales manager of the latter firm. Danielson will direct sales in southern and eastern Texas and Louisiana.

Danielson has been in the sales and field service divisions of Midwestern Engine & Equipment Co., which is an associate of the pipeline-products concern, for 9 years.

Atlas Powder Names Holman To Permian Basin Area

Willis E. Holman has been appointed as a sales representative for drilling fluid emulsifiers in the Aquaness department of Atlas Powder Co.'s chemicals division, Houston. Holman will represent Atlas in the Permian Basin area of West Texas and New Mexico.

Previously Holman was with William Cameron & Co. 7 years as sales and mud engineer.

Freeman Joins Los Angeles Office of Cooper-Bessemer

The assignment of T. L. Freeman as sales engineer to the Los Angeles district office sales and engineering staff has been announced by James W. Reed, Cooper-Bessemer Corp. vice president and Pacific Coast sales manager.

Freeman will contact users of engines and compressors regarding the engineering and application of this equipment to power and process industries. His activity will be under the direction of R. G. Williamson, branch manager.

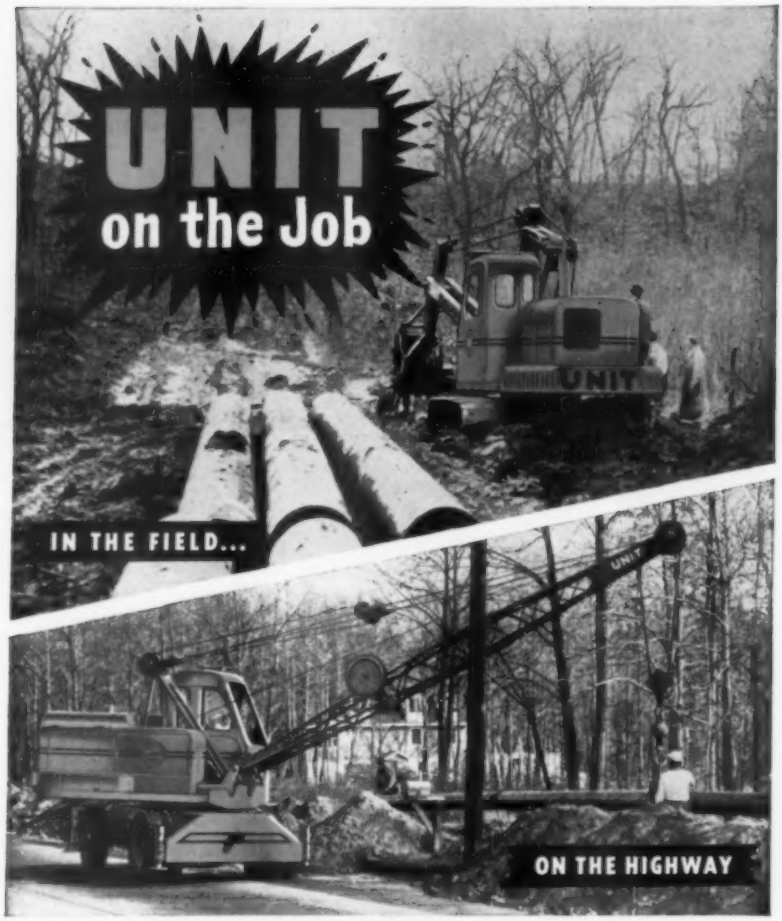
From 1949 to 1956 Freeman was project engineer for an aircraft firm.

Sparks of plenty...

East of the Appalachians, there is much evidence of Transco's continuing development of good markets for natural gas. This provides a plentiful supply of gas for the Eastern seaboard. It also assures stable income for the producers of Texas and Louisiana — by taking their gas to the places where the most people are.

HELPING TO EXPAND THE MARKETS FOR TEXAS-LOUISIANA NATURAL GAS

TRANSCONTINENTAL GAS PIPE LINE CORPORATION



Where Pipeline Goes...UNIT Goes!

In the field where the going is tough, UNIT TRENCHOES have the traction and power for continuous ditching to meet pipeline schedules. For laying pipeline along the right-of-way, where the going is smooth, the self-propelled mobile UNIT offers road travel speed, plus accurate lift and swing control. Designed for speed and stability, UNIT crawler and mobile equipment are built to meet every trenching and handling job required in pipeline construction work.

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CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

All Models Convertible to ALL Attachments!

A 7187-2/3-C

His compressor engineering training was received at Cooper - Bessemer's main engineering offices at Mount Vernon, Ohio.

M. M. & M. Names Reed as Division General Manager

J. F. REED

John F. Reed has been named general manager of the Consolidated Ashcroft Hancock division of Manning, Maxwell & Moore, Inc., according to J. Robert Kelley, president. Reed joined the company in 1944 as a planning engineer. He was previously with U. S. Steel and McDonnell Aircraft Corp. Before his new appointment, Reed was works manager of the Muskegon, Mich., plant.

Homco Announces Personnel Changes and Promotions

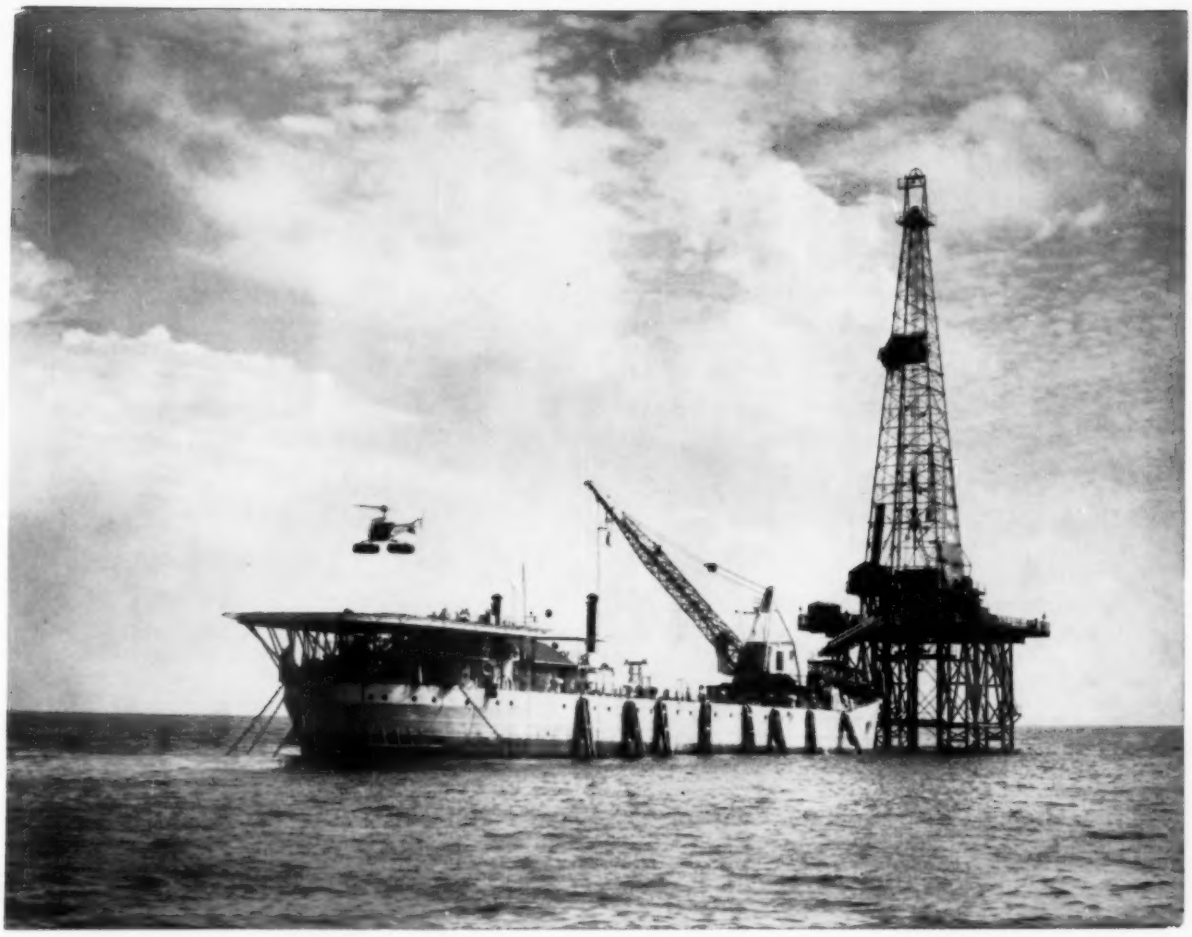
Walter P. Cutright has been advanced from sales and service representative, Edmonton, Alta., Canada, to district manager, Calgary, by Houston Oil Field Material Co., Inc., Houston. Herman Darbonne, directional drilling engineer, was moved from New Iberia to Morgan City, La.; Rayborn Herring from district manager, Morgan City, to sales engineer, New Iberia., La.; L. F. Jeter from assistant general manager, invoicing and billing, to assistant general manager of fishing, cutting and electrical well service. Dulas Massey from machinist to methods engineer, Houston.

L. R. Overstreet has been promoted from field salesman, Alice, Tex., to store manager, Farmington, N. M.; M. E. Reynolds from store manager, Corpus Christi, to manager of South Texas tubular sales, Corpus Christi; James C. Tullis from fishing tool supervisor to district manager, Harvey, La.; Guy M. Shipley to district manager of directional drilling, West Texas area, Odessa.

Raybestos-Manhattan Opens Warehouse for Odessa Area

Raybestos-Manhattan, Inc., Passaic, N. J., has opened a new warehouse at Odessa, Tex., to service the Odessa and adjacent oil-field areas. The warehouse will be operated by the Dallas district under E. W. Nagel, district manager.

Adequate space and facilities are available for stocking rotary and other types of hose, V-belts, Poly-V drives, packings, and oil-field friction material.



versatile

reclaimable

Picture shows small exploratory type structure for use with drilling tender.

This setup reduces cost of "wild-cat" operations and is reclaimable for use at future locations.

W. Horace Williams Company's design is readily adaptable to varying depths of water, giving added utility to reuse.

As many as six wells may be drilled from this size structure.

The platform may, at any time, be added to for use as a production platform or for a "self-contained" operation freeing the tender for use elsewhere.

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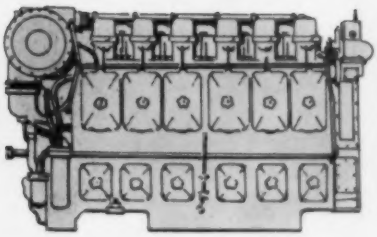
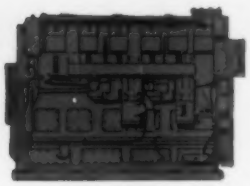
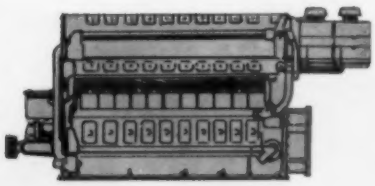


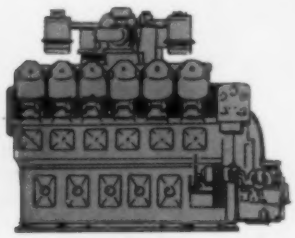
ALCO



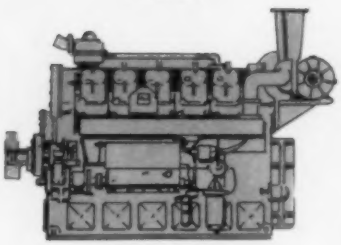
CLIMAX



FAIRBANKS, MORSE & CO.



LEROI



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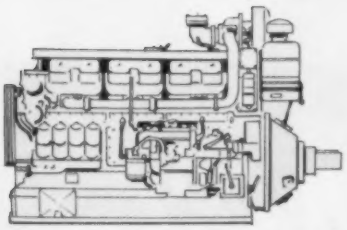
Your preference for and your familiarity with a particular make of engine need not be sacrificed to gain the benefits of General Electric drive and you may be able to use spare engines which you have in stock. Parts programs need not be complicated by the addition of a different line. General Electric and the engine builder cooperate to furnish a completely coordinated system of specialized equipment suited to your drilling needs.

AVAILABLE FOR A WIDE RANGE OF APPLICATIONS

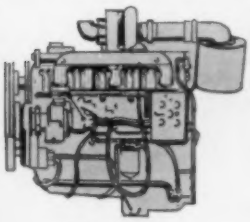
General Electric drive is available in many sizes through a wide range of applications for offshore rigs, skid and trailer-mounted land rigs, for shallow and deep well drilling . . . literally for any drilling application, and for all normal drilling functions.

DESIGNED-IN CONTROL SIMPLICITY ELIMINATES COMPLICATED EXTERNAL APPARATUS, FEED BACK SYSTEMS, AND TORQUE LIMITING DEVICES

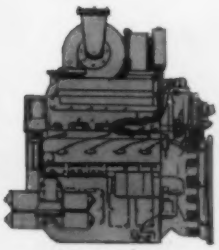
General Electric's differential generators eliminate the need for current and voltage regulating controls and other complicated apparatus used in some makes of electric drive. General Electric's familiar air throttle system eliminates the individual exciters for each generator, and G-E shunt motors will not run away in case



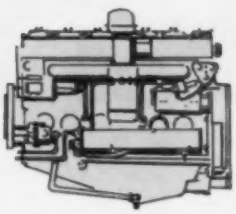
CATERPILLAR TRACTOR CO.®



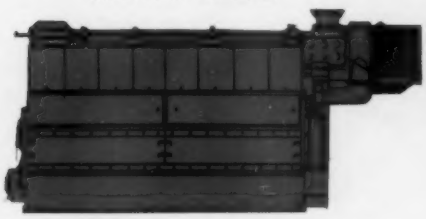
CUMMINS



HERCULES

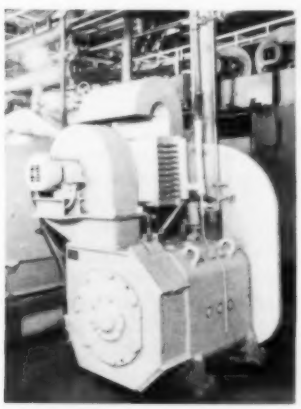


MURPHY DIESEL



WHITE-SUPERIOR

LOUISIANA DELTA OFFSHORE CORP. RIG DELTA NO. 1 equipped with ALCO engines and General Electric drive. Operating as drilling contractor for oil producers, the rig is located forty miles out in the Gulf of Mexico off the Louisiana Coast from New Orleans. **LEFT . . .** Some of the popular oil field engines with which General Electric drive can be mounted.



TYPE GE752H DRILLING MOTOR with a closed cooling system being used for mud pump drive on Delta No. 1.

OPERATOR AT DRILLERS' CONTROL CONSOLE focusing his attention on the drilling operation on Delta No. 1.

of load loss and therefore require no speed-limiting control devices.

BUILT BY THE ORIGINAL MANUFACTURER OF ELECTRIC DRIVE

General Electric is primarily an electrical equipment manufacturer with years of experience in the manufacture of electrical apparatus. The simplicity and flexibility which mark General Electric drive are the result of leadership in the electrical field.

For more information, call your nearest G-E Apparatus Sales Office. (Principal drilling offices in Dallas, Houston, New Orleans, Denver, Tulsa and Los Angeles.) Locomotive and Car Equipment Department, Erie, Pa.

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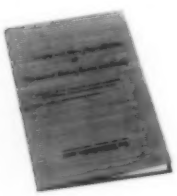
Core Lab is putting into foreign operations, an increasing number of Well Logging-Core Analysis units manned by hand-picked crews. Special details and information regarding the availability of this particular type service under contractual agreement are available upon request.



Core Lab is now distributing complimentary copies of AAPG's new 36-page publication — Sample and Core Repositories of The United States, Alaska, and Canada. Send request on your company letterhead to address below. Please mention this publication.

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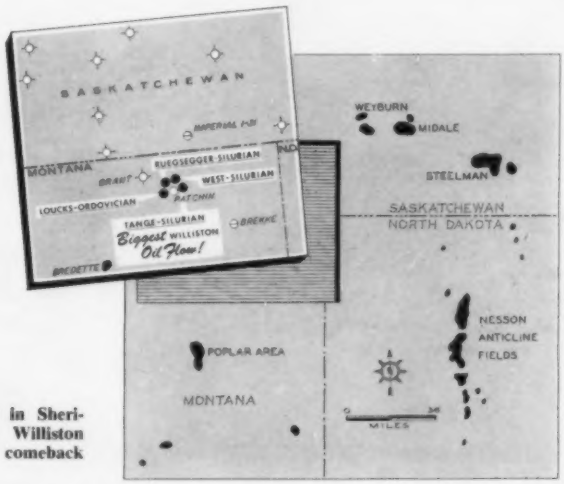
Outlook—First Step in Williston's Comeback

By John C. McCaslin
District Editor



FOUR discovery wells in Sheridan County put the Williston basin oil hunt on the comeback trail.

THE discovery of Silurian and Ordovician oil in northeastern Montana's Outlook area this year is the most significant American-side wildcat event in the Williston basin since the birth of Beaver Lodge. Flush pre-Mississippian production from four discovery wells in Sheridan County puts the Williston basin oil hunt on its first leg of a predicted comeback. Outlook's success has enlightened the potentialities of the deep Silurian, Devonian, and Ordovician rocks in this vast basin where Mississippian oil has held sway since 1951.

The first inkling of discovery news in Sheridan County came last year at Amerada Petroleum Corp.'s 1 Tange. The well capped a rather quiet and disappointing exploratory year with prolific Silurian production at the rate of 2,742 bbl. per day. It opened both a new drilling year in the Williston basin and a new oil-seeking era. With the official completion of 1 Tange early in January drilling interest in Williston soared to its highest peak since Beaver Lodge itself. Two long distance evaluation wells were staked and operations began immediately at 1 Ruegsegger and 1 Loucks. Then discovery of oil at Loucks and Ruegsegger followed closely behind the Outlook field strike.

...**Amerada** completed 1 Loucks, 4 miles southwest of Tange, for 312 bbl. of oil per day from the Red River-Ordovician, opening a new pay for the area.

...**The 1 Ruegsegger**, 2 miles northwest of the Tange well, flowed 293 bbl. of oil per day from Silurian perforations to confirm production from this zone.

And now . . . Last week Amerada confirmed Outlook field itself at 1 West, flowing 246 bbl. of oil in 16 hours on 9/64 and 8/64-in. chokes through open hole at 9,086-96 ft. in the Silurian.

Amerada's indicated confirmation success at Outlook is the northwest extension try. Other tests are under way at 1 Norager to the southeast and at 1 Grinker to the northwest. The Grinker well is slated for the 10,000 ft. Red River mark. A new location is 1 Patchin, 1½ miles northeast of Loucks.

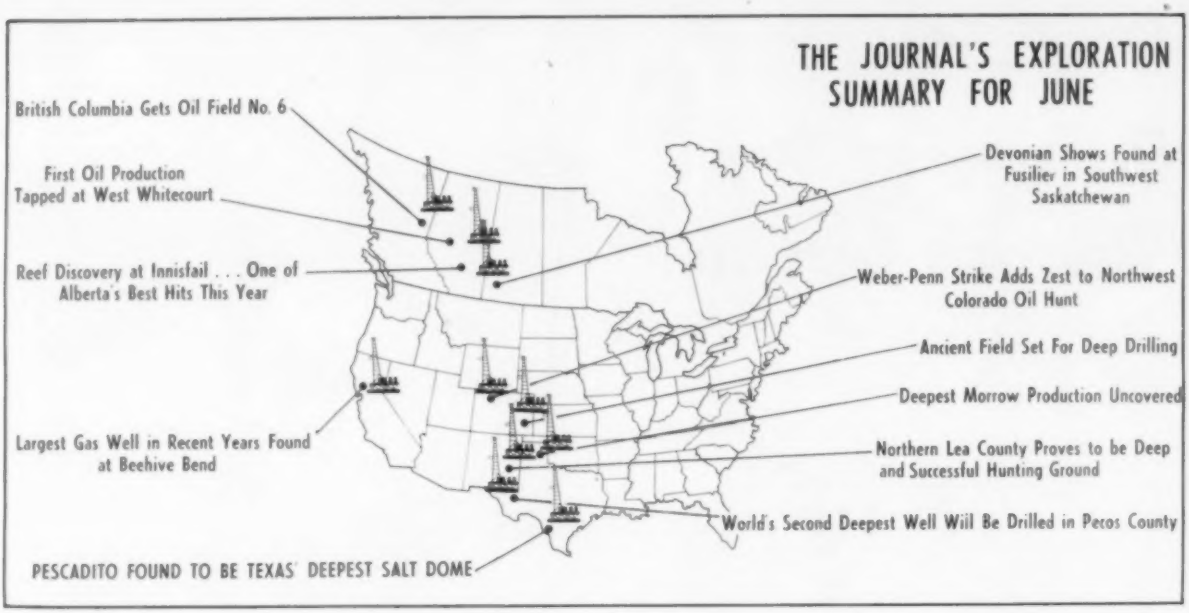
Amerada holds 120,000 acres around Outlook. They have four producers and one dry hole to their credit in this portion of northeastern Montana. The outstanding success at Outlook should trigger a big development program in this part of the Williston basin. It will not be entirely confined to the American side of the basin either. Across the border in Saskatchewan only 10 wells have ever gone down for a look at Silurian rocks in the 400 sq. miles just north of Outlook. Imperial Oil of Canada now has one working at Herald. It had some good but noncommercial shows in the Silurian section. According to reports from Saskatchewan about 10 wells will go to basement in the area 40 miles west of Herald this year.

Until Amerada dug into the thick pre-Mississippian section in Sheridan County very few wells had ever touched the Silurian on the Montana side of the new deep-drilling arena. The Texas Co. is digging hole at 1 Brekke, 30 miles southeast of Outlook, and will go to 10,500 ft. This one is being watched closely.

A Significant Boildown

The meat of the Outlook discoveries is that:

- In all four wells production is pre-Mississippian. All but a tidbit of Williston production is from Mississippian rocks in Montana, North Dakota, and Saskatchewan. Explorers were satisfied with the results they got from these rocks. But things began to slow down in the basin and some new pays had to be found. Amerada did this and the race is on.
- Nearest Silurian production in Montana is about 90 miles south-southwest. North Dakota has no Silurian production at all, although the Beaver Lodge discovery well flowed its first oil from that zone before being completed in the Madison-Mississippian. Lots of good Silurian shows have been found in North Dakota, however.
- Ordovician success at the Loucks well adds further value to this thick Williston section as a new pay target which already produces at many basin areas in Montana and South Dakota, and also at the deep test in Beaver Lodge field (1 Iverson-Nelson Unit).
- Geographically, Outlook is the nucleus of huge blocks of rank wildcat acreage. Nearest production is 29 miles southwest at Bredette.
- A vast section of southern Saskatchewan woke up to the fact that Silurian and other deep production may await the drill.
- The Williston basin is definitely on its way up again as a leading exploratory province in the country. The fact remains that Williston is still one of the largest and least-scratched sedimentary basins on the continent. Pre-Mississippian exploration is the fourth drilling cycle in the basin's short history—first was Virden, Beaver Lodge et al, Southeast Saskatchewan, and now Outlook.


THE JOURNAL'S EXPLORATION SUMMARY FOR JUNE
British Columbia Gets Oil Field No. 6
First Oil Production Tapped at West Whitecourt
Reef Discovery at Innisfail . . . One of Alberta's Best Hits This Year
Largest Gas Well in Recent Years Found at Beehive Bend
PESCADITO FOUND TO BE TEXAS' DEEPEST SALT DOME
Devonian Shows Found at Fusilier in Southwest Saskatchewan
Weber-Penn Strike Adds Zest to Northwest Colorado Oil Hunt
Ancient Field Set For Deep Drilling
Deepest Morrow Production Uncovered
Northern Lea County Proves to be Deep and Successful Hunting Ground
World's Second Deepest Well Will Be Drilled in Pecos County

June shows few successes outside of . . .

Pescadito—A New Texas Salt Dome

By John C. McCaslin
District Editor

TEXAS came forth with its most important geological news in many years —a deep hole on the long-known Pescadito structure east of Laredo that proved it to be the state's deepest salt dome. Ginther, Warren & Ginther's 1 Killam wildcat in Webb County extends the great Southwest Texas salt basin 35 miles west, opening up exciting oil possibilities.

The deeply seated Pescadito salt dome is one of southwest Texas' largest and most prominent geological features, covering more than 30,000 acres. It is 9 to 10 miles long and 4 to 5 miles wide. Based on the size of the outlined closure it may prove to be one of the largest known domes.

The operators took the hole down to salt at 15,070 ft., penetrating the salt to 15,107 ft. There were shows in the Georgetown before they hit the salt. At month's end the operators were going back to test these shows which were logged on the way down. About 1,500 ft. of Georgetown was penetrated.

Pescadito's importance lies in that it:

- Raises the possibility of other domes, perhaps deep seated and not apparent from the surface in areas where none was believed to exist.
- Gives hope of finding large oil fields buried around the dome.
- Changed three Texas drilling records. Another salt dome was added to the Southwest Texas salt basin; a new drilling-depth record for this part of the country, and a new depth record for a Texas salt core.
- Brings to six the number of such domes where salt has actually been penetrated.
- Becomes the farthest inland of the nine known or definitely indicated salt domes in the Rio Grande embayment.
- Gives geologists and geophysicists a much better idea of what they're dealing with in this remote wildcat country near the border.

The Regional Scene

Exploratory successes were few in June, but important happenings were reported in western Canada, California, Colorado, southeast New Mexico, and in far west Kansas.

In Canada . . . A reef discovery north of Calgary, Devonian oil shows at Fusilier in southwest Saskatchewan, first oil production at West Whitecourt in Alberta, and a new British Columbia oil field were the important wildcat news bits in Canada.

. . . Innisfail. Canadian Oil Cos. and its associates made one of the most significant oil strikes in western Canada this year at the Innisfail wildcat, 60 miles due north of Calgary.

The well opened up 150 ft. of Devonian D3 reef pay in an area off the beaten reef trail of Alberta south of the Joffre-Bentley trend. During tests the well flowed 55 bbl. of oil per hour.

. . . West Whitecourt. Canadian Petrofina et al uncovered the first oil production in the West Whitecourt area of Alberta at the Silver Creek discovery. Flow was 50 bbl. per hour on production tests in the Devonian D3 reef.

. . . Fusilier. Canadian Seaboard Oil Co. tapped the Devonian at a southwestern Saskatchewan wildcat, recovering a small amount of oil. This is the second time a well has found Devonian shows in the province.

The Fusilier indicated discovery is in the general Coleville-Smiley area where Banff and Viking oil successes have proved up one of Saskatchewan's major producing areas. Devonian oil production lies 60 miles west in the Youngstown area of Alberta.

A NEW LOOK

at Gravity Interpretation

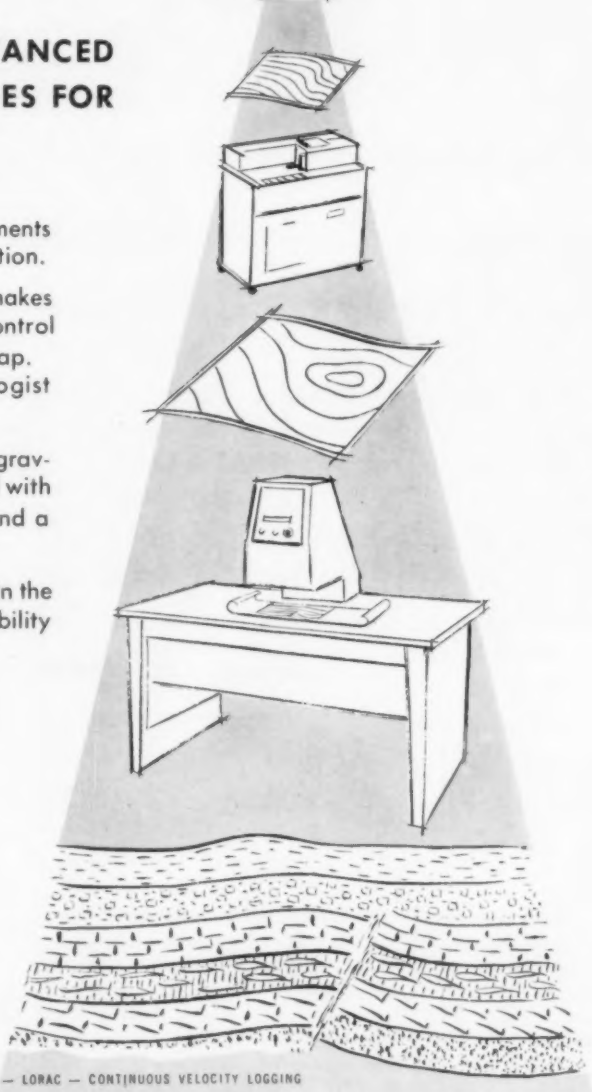
SSC OFFERS UNIQUE AND ADVANCED INTERPRETATIONAL PROCEDURES FOR GRAVITY DATA

SSC's new analytical technique supplements the conventional approach to gravity interpretation.

This greatly simplified technique now makes practical the use of the available geological control in an analytical interpretation of the gravity map. These analytical interpretations give the geologist more confidence in his gravity maps.

The processing and the interpretation of gravity data by this new technique are accomplished with the use of both a modern digital computer and a unique analog computer.

This technique can be effectively used in the interpretation of gravity data with the availability of geological control.



These services are now a part of SSC's gravity crew operations.

Contact SSC's Gravity Department for a demonstration of its new gravity technique.

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Total June Completions, Exploration and Development

	Total completions							Wildcat wells							Act.
	Total	Crude	Cond.	Gas	Dry	Service	Footage	Total	Oil	Gas	Dry	Footage	C.T.	D.D.	op.
Alabama	8	6	0	0	2	0	77,173	2	0	0	2	8,755	1	0	20
Arkansas	96	53	0	5	38	0	328,756	25	3	2	20	103,245	0	0	102
California	191	129	0	8	54	0	847,948	41	0	3	38	223,307	0	0	225
Colorado	50	7	0	0	43	0	260,977	37	1	0	36	188,011	0	0	50
Illinois	176	62	0	2	112	0	404,795	44	2	0	42	90,444	60	7	360
Indiana	38	15	0	2	21	0	73,979	8	1	0	7	13,431	25	0	83
Kansas	316	127	0	31	151	7	1,142,120	66	6	6	54	266,847	21	0	449
Kentucky	84	30	0	3	51	0	106,546	17	1	1	15	23,598	75	0	200
West	80	30	0	0	50	0	94,147	16	1	0	15	18,821	71	0	135
East	4	0	0	3	1	0	12,399	1	0	1	0	4,777	4	0	65
Louisiana	296	141	0	37	118	0	2,516,622	63	3	10	50	641,867	0	0	474
North	88	35	0	12	41	0	350,965	20	1	1	18	112,047	0	0	125
South	146	71	0	21	54	0	1,586,185	36	2	7	27	443,349	0	0	250
Offshore	62	35	0	4	23	0	579,472	7	0	2	5	86,471	0	0	99
Michigan	29	12	0	0	17	0	79,899	13	1	0	12	31,128	24	0	85
Mississippi	23	4	2	0	17	0	174,009	17	1	0	16	127,639	1	0	35
Montana	41	21	0	1	19	0	185,480	14	2	0	12	64,981	13	0	75
Nebraska	54	21	0	1	32	0	317,173	30	3	1	26	164,483	0	0	60
West	53	21	0	1	31	0	313,083	29	3	1	25	160,393	0	0	58
East	1	0	0	0	1	0	4,090	1	0	0	1	4,090	0	0	2
New Mexico	179	104	1	55	19	0	938,745	16	4	1	11	122,555	3	0	228
Northwest	70	11	1	52	6	0	303,303	4	1	0	3	17,646	0	0	98
Southeast	109	93	0	3	13	0	635,442	12	3	1	8	104,909	3	0	130
New York	35	17	0	0	0	18	35,000	0	0	0	0	0	35	0	21
North Dakota	18	9	0	0	9	0	119,751	9	1	0	8	44,676	0	0	31
Ohio	91	52	0	13	16	10	231,725	1	1	0	0	4,395	91	4	121
Oklahoma	411	233	0	17	143	18	1,502,652	42	9	1	32	191,662	91	9	814
Pennsylvania	17	0	0	12	5	0	124,635	2	0	1	1	15,370	0	0	52
Texas	1,464	882	27	60	485	10	6,174,715	307	49	3	255	1,426,008	90	18	1,305
Dist. 1	106	59	1	0	45	1	205,912	34	0	0	34	92,753	0	1	40
Dist. 2	49	11	6	8	24	0	297,217	16	1	2	13	100,202	0	1	46
Dist. 3	157	82	8	4	57	6	1,055,321	27	6	0	21	236,018	0	2	35
Dist. 4	88	30	11	6	41	0	478,860	15	0	0	15	77,190	0	2	71
East	108	56	0	1	51	0	536,421	41	5	0	36	195,660	0	0	50
Dist. 7-B	140	70	0	1	69	0	479,994	45	10	0	35	152,243	42	1	89
West	422	349	0	4	67	2	1,956,555	51	13	0	38	284,342	41	11	602
Dist. 9	285	153	0	9	123	0	764,632	72	13	1	58	237,341	7	0	148
Dist. 10	109	72	1	27	8	1	399,803	6	1	0	5	50,259	0	0	124
Utah	15	6	0	0	9	0	83,189	7	1	0	6	40,914	0	0	59
Virginia	2	0	0	2	0	0	9,876	0	0	0	0	0	2	0	0
Washington	1	0	0	0	1	0	6,001	1	0	0	1	6,001	0	0	2
West Virginia	54	9	0	34	11	0	139,398	2	0	1	1	9,405	54	0	160
Wyoming	59	21	0	3	32	3	264,215	17	0	0	17	84,791	12	0	131
Total June 1957	3,748	1,961	30	286	1,405	66	16,145,379	781	*89	30	662	3,893,513	598	38	5,142
Total May 1957	4,853	2,528	62	332	1,838	93	20,355,369	1,119	134	49	936	5,490,683	612	46	5,170
First half 1957	25,761	13,567	222	1,878	9,549	545	107,744,867	5,814	710	238	4,866	28,471,181	3,790	258	.....
First half 1956	28,838	15,608	267	1,911	10,564	488	117,327,000	6,301	843	205	5,253	30,177,000	.....	.....	.....

*Incl. 4 dist. Note: C.T. = cable tool comp., D.D. = O.W.D.D., Act. op. = active operations.

Completions for Western Canada—June 1957

	Total wells					Cum.	Wildcat wells					Cum.
	Total	Oil	Gas	Dry	Footage	1957	Total	Oil	Gas	Dry	Footage	1957
Alberta	140	97	15	28	728,674	690	25	3	2	20	137,008	189
Saskatchewan	136	88	2	46	597,489	563	44	8	2	34	193,316	138
Manitoba	32	18	0	14	74,620	127	13	0	0	13	34,238	34
British Columbia	6	0	6	0	35,097	44	3	0	3	0	23,142	26
N.W.T.	0	0	0	0	0	0	0	0	0	0	0	3
Total	314	203	23	88	1,435,880	1,427	85	11	7	67	387,704	390

. . . British Columbia. The sixth oil discovery in British Columbia this year was reported in June at a wildcat near the town of Fort St. John. Pacific Petroleums, Ltd., and Associates 93 Charlie Lake flowed 20 bbl. of oil per hour on tests of the Gething-Lower Cretaceous at 3,320-40 ft. This is the first free oil from the Gething formation in B. C. Previously the Gething was known only for its gas production. Gething oil is found at Rycroft, 110 miles southeast of Charlie Lake in Alberta.

In California . . . California, which depends heavily on imported gas, brought in one of its best gas wells since World War II. The big well is General Petroleum Corp. 2 Sprague Lewis on the north edge of Beehive Bend gas field, Glenn County. The operator tested 36,000 M.c.f. of gas per day from two zones.

In New Mexico . . . A yet unnamed basin in northern Lea County is proving to be a deep but prolific source of new oil for the Permian basin province.

Three discoveries in this still-undefined basin in the northern part of the county found oil in the deep Devonian and Permo-Pennsylvanian. Texas Pacific Coal & Oil Co. 1 Collier on the west side flowed 30 bbl. of oil per hour from the Permo-Pennsylvanian at 10,110-16 ft.; Amerada Petroleum Corp. 1 "EC" State on the east side flowed 370 bbl. of oil in 14 hours from Devonian at 12,021-96 ft.; and Union Oil Co. of California 1 Duncan near the center flowed 15-20 bbl. of oil per hour on test of the Permo-Pennsylvanian. The Union discovery indicates that production extends across the

(Text continued on page 319)
(Tables continued on pages 314-317)

Used by more drillers on more mud pumps than any other V-belt made

World leadership is the result of these 4 engineering developments

1. Tougher, more resilient cords are able to absorb the severe pulsations of mud pumps; easily handle peak loads.

2. True-fitting concave sidewalls (U. S. Pat. No. 1813698). As a Gates Belt bends around a sheave, the concave sides fill out . . . become straight . . . fit sheave grooves evenly. (Fig A.) This uniform groove contact insures greater pulling power, less wear, longer life.

Straight sided belts bulge at the sides when bent. Uneven contact (Fig. B) causes uneven wear; shortens belt life.

3. Stabilizing ribbed tops (U. S. Pat. No. 2548135) are exclusive with Gates. They dampen vibration, protect top of belt from damage, keep belt running smoothly over idler-equipped mud pump drives with no side whip.

4. Flex-Weave cover (U. S. Pat. No. 2519590) provides greater flexibility with far less stress on fabric. Wears longer . . . lengthens belt life . . . lowers belt costs.

The four engineering developments shown at left make Rib-Top an outstanding performer in mud pumping operations.

Yet Rib-Tops cost no more than ordinary belts of comparable ratings.

For fewer V-belt replacements and lower costs on mud pump drives, always specify Rib-Top. Both Standard and Super Rib-Top are available at your nearby oil field supply house.

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World's Largest Maker of V-Belts

Put Super Rib-Top on the tougher drive jobs. With 40% greater horsepower capacity, Super Rib-Top easily handles drive overloads. Fewer belts and narrower sheaves solve space and weight problems.

Gates The Mark of *Specialized* Research

Gates Rib-Top Vulco Rope

DEVELOPED ESPECIALLY FOR MUD PUMP DRIVES

TPA 167

Breakdown of Wildcats Drilled in June 1957, by Depth

	Oil									Gas									Dry								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Alabama																			1					1			
Arkansas		1		1	1								1	1					1	2	8	2	6	1			
California										1				1	1				3	3	5	8	9	5	4	1	
Colorado				1																	2	14	19	1			
Illinois			2																12	12	18						
Indiana	1																		1	5	1						
Kansas		1	2	3									1	5						1	23	23	7				
Kentucky		1											1						11	3	1						
Louisiana			1					2								2	5	3	1	1	3	5	5	8	14	10	3
North			1													1			1	1	3	5	5	2		1	
South								2								1	4	2						5	12	8	2
Offshore																	1	1						1	2	1	1
Michigan			1																1	5	5	1					
Mississippi						1																	14	1		1	
Montana			1				1													4	1	3	3			1	
Nebraska					3								1								1	8	17				
West					3								1								1	7	17				
East																						1					
New Mexico				1	1	1	1											1	1	1	2	1	2		1	3	
Northwest					1																2		1				
Southeast				1		1	1											1	1	1		1	1		1	3	
North Dakota				1															1		1	3	2	1			
Ohio				1																							
Oklahoma	1			2	5	1								1					5	1	7	3	14	1	1		
Pennsylvania															1									1			
Texas		3	6	12	13	9	5	1				1		2					16	64	56	34	48	26	5	5	1
Dist. 1																			5	13	11	3		2			
Dist. 2						1						1		1						1		3	3	5	1		
Dist. 3					1	3	2													1	1	1	5	7	2	3	1
Dist. 4																			1		4	2	6	2			
East				2	3														2	5	3	7	16	3			
Dist. 7-B		1	3	5	1														2	11	11	8	3				
West			1	3	1	5	2	1											2	4	13	5	7	5	1	1	
Dist. 9		2	2	2	7									1					4	29	12	4	8	1			
Dist. 10							1														1	1		1	1	1	
Utah					1																1		4	1			
Washington																							1				
West Virginia																						1					
Wyoming														1					1	3	1	3	7	2			
Total U. S., June	2	6	13	22	24	12	7	3		1		2	4	10	2	2	5	4	55	105	136	109	158	49	25	21	4
Total 6 mos.	20	80	101	131	180	99	58	29	12	6	8	19	29	67	54	28	17	10	387	922	899	804	1,135	414	200	84	21
W. Canada, June			3	6	2							2	2	1	2				1	10	11	29	11	2	3		
Alberta			1		2								2						1	2	2	7	4	1	3		
Saskatchewan			2	6								2								1	4	21	7	1			
Manitoba																				7	5	1					
British Columbia														1	2												
W. Canada, 6 mos.			5	22	6	4	1					3	8	8	6	4	2	1	10	35	71	95	73	21	15		

NOTE: A = 0-1,250 ft.; B = 1,250-2,500 ft.; C = 2,500-3,750 ft.; D = 3,750-5,000 ft.; E = 5,000-7,500 ft.; F = 7,500-10,000 ft.; G = 10,000-12,500 ft.; H = 12,500-15,000 ft.; I = 15,000 ft.

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Breakdown of Field Wells Drilled in June 1957, by Depth

	Oil									Gas									Dry								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Alabama							6																				
Arkansas	1	28	11	8	1	1							1	2						3	8	3	4				
California	13	29	23	21	13	13	9	7	1					5					2	2	5	2	5				
Colorado				4	2																	2	4	1			
Illinois	6	24	30							2									6	21	42	1					
Indiana	2	12								2									6	4	4						
Kansas		14	65	36	6							16	6	3						7	60	31	6				
Kentucky	20	8	1								1	1							17	17	2						
West	20	8	1																17	16	2						
East											1	1								1							
Louisiana		27	7	9	16	33	29	14	3		4			4	7	2	9	1		3	14	3	8	16	15	5	4
North		24	7	3							4			2	5					3	11	3	4	2			
South		3		5	8	15	22	13	3					1	1	2	9	1			2		3	7	8	3	4
Offshore				1	8	18	7	1						1	1						1		1	7	7	2	
Michigan		3	4	3	1															3	2						
Mississippi				1	1	2	1																1				
Montana		7	4		2	6					1									1	2	4					
Nebraska			1		15	2																	6				
West			1		15	2																	6				
East																											
New Mexico	1	8	30	31	8	4	17	2			12	15	3	23	1				2		1	2	2			1	
Northwest		1	2	1	6	1					12	15	1	23	1				1		1		1				
Southeast	1	7	28	30	2	3	17	2					2						1			2	1			1	
New York	17																		18					1			
North Dakota				1		7																					
Ohio	10	4	37							3	2	7	1						6	6	14						
Oklahoma	19	66	66	29	25	15	4			1	3	1	2	6	3				13	27	38	32	12	6	1		
Pennsylvania														11									4				
Texas	77	157	253	118	157	75	21	2			19	10	10	15	3				25	75	37	39	38	25	1		
Dist. 1	33	15	11				1												4	6	1		1				
Dist. 2	1			3	4	8					1	1		4						1	1	5	2	2			
Dist. 3	3	8	7	6	24	27	9						3	1					4	1	10	2	12	12	1		
Dist. 4	2	5	10	4	12	5	3					1	3	2						1	6	2	9	8			
East	3	2	4	8	22	11	1							1					4		2	3	6				
Dist. 7-B	6	11	9	19	15						1								4	15	3	10	2				
West	8	41	136	58	64	20	7	2						2	2						4	7	14	4	2		
Dist. 9	21	73	16	20	10							1	2	5					9	43	7	3	2	1			
Dist. 10		2	60		6	4					17	7	2		1					4							
Utah					5																1		2				
West Virginia	2	5	2								16	13	4						1	6	1	1	1				
Wyoming	3	1	6	4	4	3						1	1	1					3		7	3	2	2	1		
Virginia													2														
Total U. S., June	171	393	540	265	256	161	87	25	4	8	58	64	30	70	14	2	9	1	99	175	238	123	95	51	18	6	4
Total 6 mos.	1,244	3,013	3,578	1,958	1,709	981	460	123	13	64	340	391	257	359	127	48	43	11	782	1,268	1,433	676	602	251	130	67	19
W. Canada, June		21	13	111	37	10						6	6	3		1			1	3	1	3	11	2			
Alberta		4	8	35	37	10						6	3	3		1				1	1	1	3	2			
Saskatchewan			4	76															1	1		2	8				
Manitoba		17	1																	1							
British Columbia													3														
W. Canada, 6 mos.		104	52	490	191	54					6	12	18	10	2	2			1	16	14	34	23	8			

NOTE: A = 0-1,250 ft.; B = 1,250-2,500 ft.; C = 2,500-3,750 ft.; D = 3,750-5,000 ft.; E = 5,000-7,500 ft.; F = 7,500-10,000 ft.; G = 10,000-12,500 ft.; H = 12,500-15,000 ft.; I = 15,000 ft.

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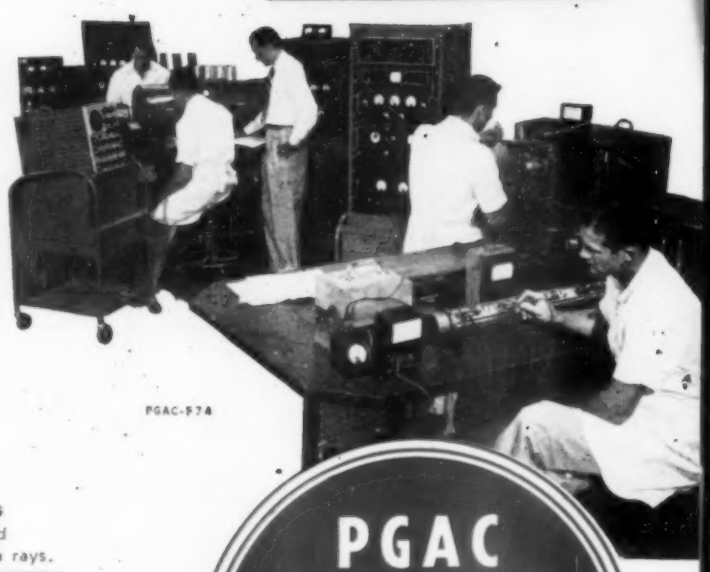

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1948 **Developed JET SHOT PERFORATING TECHNIQUES**
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accomplished jet acceptance in oil fields.

1949 **Developed NEW GAMMA RAY INSTRUMENTS**
... with quantitative calibration for more precise radioactive logging of formations.

1950 **Developed SIMULTANEOUS RADIATION LOGGING**
... utilizing a pure neutron/neutron to avoid faulty phenomena of detrimental gamma rays.

1951 **Developed FOUR-RESISTIVITY-CURVE ELECTRICAL LOG**
... employing an S. P. curve of greater detail for more accurate analysis of formations.

1952 **Developed JUMBO SIDEWALL CORE SAMPLING**
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FOOTAGE BREAKDOWN FOR JUNE 1957

	Fields			Wildcats		
	Oil	Gas	Dry	Oil	Gas	Dry
Alabama	68,418	.....	.....	.....	.....	8,755
Arkansas	144,121	14,923	66,467	11,927	10,961	80,357
California	527,219	24,579	72,843	.....	14,578	208,729
Colorado	32,385	.....	40,581	4,860	.....	183,151
Illinois	139,703	992	173,656	6,174	.....	84,270
Indiana	24,056	1,538	34,954	1,220	.....	12,211
Kansas	421,327	86,553	367,393	22,046	32,626	212,175
Kentucky	30,866	5,942	46,140	2,239	4,777	16,582
West	30,866	.....	44,460	2,239	.....	16,582
East	.....	5,942	1,680	.....	4,777	.....
Louisiana	1,067,237	258,977	548,541	30,558	136,511	474,798
North	81,593	64,620	92,705	3,340	11,604	97,103
South	685,220	178,755	278,861	27,218	96,813	319,318
Offshore	300,424	15,602	176,975	.....	28,094	58,377
Michigan	36,852	.....	11,919	2,610	.....	28,518
Mississippi	39,570	.....	6,800	9,010	.....	118,629
Montana	93,764	1,338	25,397	13,430	.....	51,551
Nebraska	114,735	.....	37,955	18,621	3,306	142,556
West	114,735	.....	37,955	18,621	3,306	138,466
East	.....	.....	.....	.....	.....	4,090
New Mexico	550,692	228,847	36,651	31,763	15,566	75,226
Northwest	56,529	220,072	9,056	6,022	.....	11,624
Southeast	494,163	8,775	27,595	25,741	15,566	63,602
New York	17,000	.....	18,000	.....	.....	.....
North Dakota	65,841	.....	9,234	4,302	.....	40,374
Ohio	135,328	31,327	60,675	4,395	.....	.....
Oklahoma	787,951	84,561	438,478	49,677	5,745	136,240
Pennsylvania	.....	81,891	27,374	.....	7,540	7,830
Texas	3,638,681	234,765	875,261	299,204	16,690	1,110,114
Dist. 1	87,590	.....	25,569	.....	.....	92,753
Dist. 2	110,848	28,682	57,485	8,015	9,870	82,317
Dist. 3	561,092	20,308	237,903	55,276	.....	180,742
Dist. 4	220,585	31,053	150,032	.....	.....	77,190
East	276,543	6,130	58,088	26,286	.....	169,374
Dist. 7-B	224,358	2,438	100,955	40,671	.....	111,572
West	1,544,797	30,221	97,195	99,145	.....	185,197
Dist. 9	345,884	42,392	139,015	58,431	6,820	172,090
Dist. 10	266,984	73,541	9,019	11,380	.....	38,879
Utah	27,742	18,766	13,533	5,688	.....	35,226
Washington	.....	.....	.....	.....	.....	6,001
West Virginia	16,407	89,004	24,582	.....	4,738	4,667
Virginia	.....	9,876	.....	.....	.....	.....
Wyoming	88,678	12,611	78,135	.....	.....	84,791
Total U. S.	8,069,573	1,167,724	3,014,659	517,724	253,038	3,122,751
Western Canada:						
Alberta	489,139	60,062	42,465	16,707	11,440	108,861
Saskatchewan	357,283	0	46,890	32,588	6,026	154,702
Manitoba	38,327	0	2,055	0	0	34,238
British Columbia	0	11,955	0	0	23,142	0
Western Canada	884,749	72,017	91,410	49,295	40,608	297,801

deeper central part of the basin and labels the whole area as first-class oil-hunting territory.

In Colorado . . . The nation's second oldest oil-producing area, Florence-Canon City field, is in line for some deeper prospecting. After more than 80 years the drill will show if any oil is below the shallow Pierre shale. Mile High Oil Co. plans a deep wildcat this summer at Florence-Canon City. Production now is from the Upper Cretaceous at about 1,200 ft. Oil was first found here in 1862.

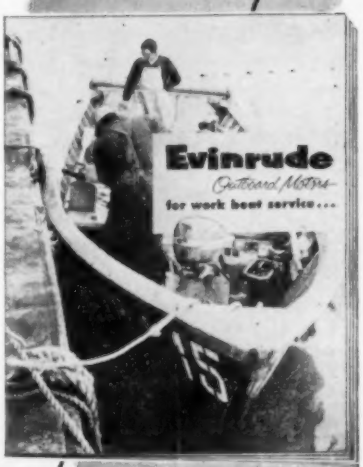
. . . New Weber interest. Malco Refineries, Inc., deepened the discovery well of Buck Peak field in northwestern Colorado's Piceance Creek basin and found oil in the Weber-Pennsylvanian. The original well had Shinarump-Triassic production. The new-pay discovery is expected to further stir the search for Weber oil in northwestern Colorado. Nearest Pennsylvanian production is at Thornburg, 17 miles southwest. The state's deepest well, Phillips Petroleum Co.'s Powell Park wildcat, is below 16,000 ft. on its way to the Weber. This formation is fast becoming of age in exploration throughout this section of the state.

In Texas . . . The world's second deepest well will be drilled 13 miles southwest of Fort Stockton by Phillips and Sinclair at 1 Montgomery "A", Pecos County.

The operators plan to take this one to 22,000 ft., making it the deepest well in Texas and only 570 ft. short of the world record holder in South Louisiana which stopped at 22,570 ft. and found production at a record depth of 21,443 ft.

. . . Morrow record. The deepest Morrow-Pennsylvanian production ever uncovered was found at a Sun Oil Co. wildcat in northeastern Roberts County in the Texas Panhandle.

new book



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EXPLORATION HIGHLIGHTS

APPALACHIAN

WEST VIRGINIA

Three Rank Wildcats Announced in State

Three wildcat locations were announced in various exploratory areas of West Virginia last week.

In Davis district, Tucker County, Cumberland & Allegheny Gas Co. 1-556 W. Va. Power & Transmission Co., elevation 3.255 ft., Davis Quadrangle, 3.65 miles south of latitude 39 degrees 10 minutes and 2.05 miles west of longitude 79 degrees 20 minutes.

Another rank one will go down in Licking district at Hope Natural Gas Co. 10097 Arlie W. Myers, elevation 1,967 ft., Kingwood Quadrangle, 5.70 miles south of latitude 39 degrees 20 minutes and 3.80 miles west of longitude 79 degrees 40 minutes.

The third rank test will be in Reno district, Preston County. This one is Hope 10096 Florence M. Auvil, elevation 2,028 ft., Thornton Quadrangle, 5.74 miles south of latitude 79 degrees 20 minutes and 0.08 mile west of longitude 79 degrees 45 minutes.

Exploration This Week

Appalachian	320
Arkansas	320
California	321
Canada	321
Kansas	325
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Nevada	326
New Mexico	326
Oklahoma	326
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Texas	332
Washington	339
Wildcats	340

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Logan District Wildcat Dry in Oriskany

A Logan district wildcat, Logan County, was dry in the Oriskany sand topped at 5,678 ft. The well, Carnegie Natural Gas Co. 15-1704 U. S. Steel Corp., was plugged back and will be shot in the shale.

PENNSYLVANIA

Armstrong Township Chert Well Shut in for Test

In Armstrong Township, Indiana County, Manufacturers Light & Heat Co. 4430 R. & P. Coal Co. is still shut down at 7,777 ft. The well is shut in for rock pressure test.

Gas from the chert tests 108,000 cu. ft. after second fracture.

• In Washington Township, Columbian Carbon Co. 1844 Silas C. Streams is drilling at 7,543 ft. Additional salt water was found at 7,514 ft.

ARKANSAS

Swabbing Yields Oil In Miller County Wildcat

A wildcat in the Jonesville area, 3 miles southwest of Fouke, Miller County, in the extreme southwestern corner of the state, is proving productive in the Lower Cretaceous - Mooringsport horizon, perforated at 5,052-57 ft.

The indicated discovery well, 1 Dysart Heirs, drilled by E. A. Carter, has been swabbing 14 bbl. of clean oil per hour without lowering fluid level

below 3,200 ft. It will be placed on the pump for completion. Gravity of the oil is 25°.

Location, in the SE SW SE 30-17s-27w, is about 2 miles southwest of West Fouke field.

CALIFORNIA

Beehive Bend Extender May Link New Oil Area

E. L. Doheny reports completion of an important extension in the Beehive Bend gas field in Glenn County, northern California. The well, 1 Section 48 Unit, flowed 3,900 M.c.f. daily through a ⅜-in. choke. Perforations are at 5,446-78 ft. and 5,490-5,505 ft. Total depth is 7,454 ft. This well, in SE SE 22-20n-2w, is 1 mile north of Beehive Bend production and 1½ miles southeast of Doheny's Vestner new pool discovery.

Production Spreads in South Mountain Field

King Petroleum Co. and Kenneth Hunter, Jr., have extended production in the old South Mountain field about ¼-mile southeast of regular production. Their successful test is 1 Hunter-McCormick, completed at 6,920-7,165 ft. for 300 bbl. daily of 17.3°-gravity crude, 17 per cent cut. It is in SW SW 29-3n-20w, Ventura County.

Oil Discovery at Bandini Opens New Fault Block

Nordon Corp., Ltd., has completed B-2 Aeco - Bonsall - Crawley, its new fault block discovery well in Bandini field, Los Angeles County, flowing 600 bbl. daily of clean 36°-gravity crude. Nordon found the new Meyer zone production at 5,378-5,488 ft. in the 5,674 ft. test. Location is on the north edge of the field.

CANADA

ALBERTA

Innisfail Followup Well Begins Drilling

Canadian Oil Companies, Ltd., have announced the first followup well to their recent White Rose-C. & E. 1-16 Innisfail oil discovery.

This discovery has now been completed after finding 148 ft. of oil-bearing reef. Now on production, the well is producing its allowable of 600 bbl. per day.

The followup well, White Rose-C. & E, 11-3-35-1w Innisfail is to be located 1½ miles southeast of the discovery.

Working interest in the well will be shared 50 per cent by Canadian Oils and 25 per cent each by the Calgary & Edmonton Corp., Ltd., and Security Freehold Petroleums, Ltd.

WESTERN CANADA

Six Discoveries Reward Week's Wildcat Activity

Independent and major companies shared equally in the six oil and gas discoveries recorded in western Canada last week. Another equal split was noted between Alberta and Saskatchewan as each province came up with three new finds.

In Alberta, an oil strike was chalked up in the southern part of the province, 48 miles northeast of Lethbridge, by Southland Royalty Co. and Greta Petroleums, Ltd. Another independent group, headed by New Superior Oils of Canada, Ltd., of Calgary, got a gas strike in the Garrington area, 60 miles north of Calgary. Hudson's Bay Oil & Gas Co., Ltd., came up with a gas discovery in the Forestburg area.

In Saskatchewan, all three of the most

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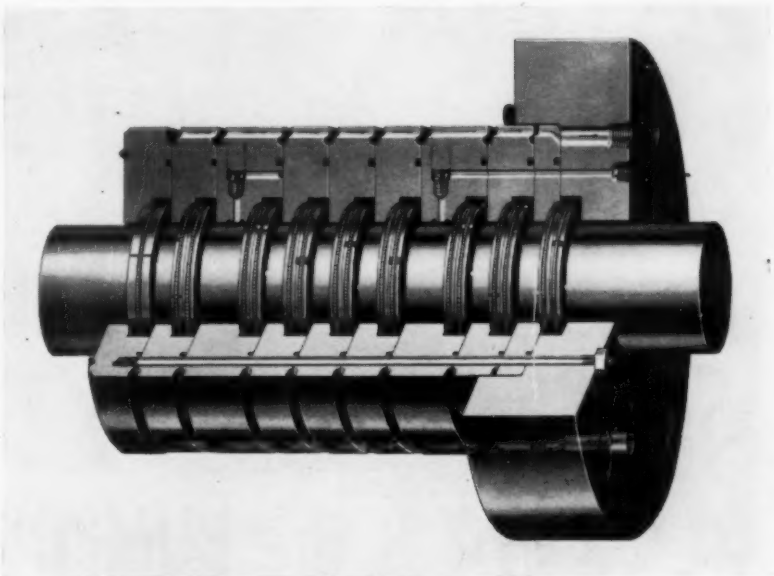

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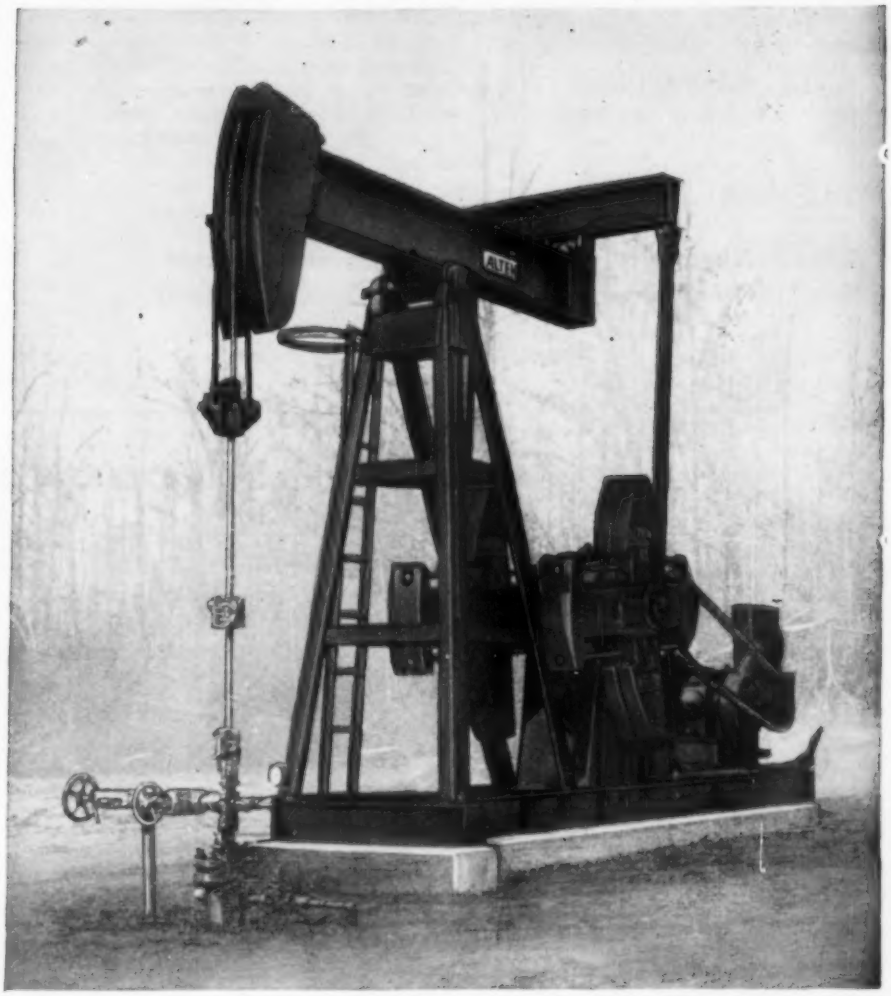

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recent discoveries found oil in indicated commercial volume. Two of the discoveries were made by Imperial Oil, Ltd., in the Browning and Willmar districts. The third was drilled by Sohio Petroleum Co. in the Roughbark area. These areas are in the southeast sector of the province in the province's main producing areas.

Alberta discoveries . . . The Southland, Royalty-Greta Petroleums, Ltd., team's Hays test in southern Alberta, near Tabor, has been placed on production test. It flowed oil at the rate of 5 bbl. per hour. Operators are installing pump to place the discovery on steady production. Discovery zone is the Ellis sand, topped at the 3,000-ft. level. The well was bottomed at 3,051 ft. and production casing set at 3,046 ft.

The Garrington Viking gas strike recorded by New Superior Oils, General Petroleums, Altex Oils, Ltd., and Hudson's Bay Oil & Gas, Ltd., is the next most southerly Alberta find. This well, Garrington No. 4-20, is on Drilling Reservation Lands, 4 miles northeast of Mississippian oil wells in Sundre field. It is 20 miles northwest of Olds. Production tests in the Viking sand yielded gas at rate of 4,000,000 cu. ft. per day with a recovery of 1.7 gal. of condensate per thousand cubic feet. Estimated open-flow potential was between 8,500,000 and 11,000,000 cu. ft. per day.

Saskatchewan discoveries . . . Imperial's Willmar No. 12-24 wildcat, 12 miles northeast of Steelman oil field flowed oil to surface during initial drill-stem test in the Mission Canyon section of the Mississipipan. Test interval was 4,102-16 ft., and valve was open 130 minutes. There was no gage on flow but oil came to surface in 96 minutes. Pipe recovery showed 4,100 ft. of clean oil.

Imperial also is waiting to establish initial production rate at its Browning No. 12-36 strike, 10 miles north of Steelman field, and 6 miles west-northwest of the Willmar find. A series of drill-stem tests was run with the most conclusive interval at 4,136-46 ft. During a 24-minute test, this well flowed 155 bbl. of oil, cut with 0.2 per cent b.s. Gravity of oil was 36.5° A.P.I. The discovery zone was topped at 4,137 ft., and well is bottomed at 4,250 ft.

Sohio Petroleum chalked up its oil discovery at the South Roughbark No. 16-31 well, 2 miles south of the Weyburn field, during drill-stem test at 4,736-83 ft. When pipe was pulled after valve was open 120 minutes, it contained 60 ft. of heavily oil and gas-cut mud and 2,114 ft. of clean oil.

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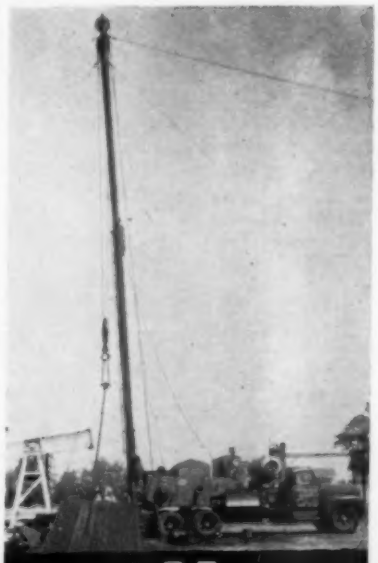

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KANSAS

Simpson Discovery Finaled in Pratt County

Lion Oil Co. Division of Monsanto Chemical Co. has completed the 1 Hoeme as an oil discovery in Pratt County.

The well, on a lease wholly owned by the company, is flowing oil at the rate of 120 bbl. per day through an 18/64-in. choke. Completion was in the Simpson formation through perforations from 4,350 ft. to 4,356 ft.

Drilled in the NW ¼ of the SW ¼ of 17-27s-12w, the discovery well is about 4 miles northeast of the city of Pratt, Kans. It is located on a 1,540-acre block of leases owned by the company. Drilling will begin immediately on a confirmation well east of the discovery.

The company has 50 per cent interest in another new Simpson formation oil discovery in Pratt County, the 1 Jem, which was completed recently by R. W. Rine Drilling Co.

The well is pumping 45 bbl. of oil daily. It is located 10 miles south of Pratt and 4 miles west of Sawyer, Kans. Monsanto owns full-interest leases on 800 acres within 1 mile of the Jem.

Wichita County Wildcat Reports Oil Show

Musgrove Petroleum Corp. 1 Nelson, rank western Kansas wildcat in 16-17s-37w, Wichita County, recovered 115 ft. of oil-cut mud while drill-stem testing in the Marmaton at 4,504-45 ft. The tool was open 1 hour. Maximum flowing pressure was 120 psi., with shut-in pressure of 1,120 psi.

Following the test, drilling continued toward contract depth of 5,000 ft. On elevation of 3,362 ft., the well had the Morrow sand at 4,856 ft., and the Mississippian at 4,922 ft.

No. 1 Nelson is 32 miles north of Patterson pool in Kearny County, and is said to be one of a series to be drilled by Musgrove Petroleum in that area.

MICHIGAN

Oceana County Wildcat Flows Oil from Dundee

Swan-King Oil Co. and W. L. Harvey appear to be making a flowing oil producer in the Dundee section at their Crystal Township wildcat in Oceana County.

Testing in the Dundee, perforated at 2,508-14 ft., follows failure of the deeper Reed City zone, logged at 2,578-87 ft., to hold at a producing level considered good enough for a single-horizon completion. The Reed City section now is bridged off.

The well is the 1 Skidmore Land Co., in the SW NE NE 15-16n-16w.

Flowing production in the Dundee showed up after the well had been pumped 3 days with drilling machine following acidization. During the pumping period, the well produced 34 bbl. of oil and 162 bbl. of water the first day; 50 bbl. of oil and 130 bbl. of water the second day; and 100 bbl. of oil and 100 bbl. of water the third day.

It then kicked off and flowed 130 bbl. of net oil, plus water, the next day. With flow restricted by a ⅛-in. choke, the well produced 40 bbl. of oil and 40 bbl. of water in 12 hours.

A pumping unit has been moved in to permit immediate pumping of water that might kill the oil flow. Operators do not plan to attempt shutting off the water by squeeze cementing.

Top of the Dundee was logged at 2,496 ft. Pay was perforated with 18 shots, and acidized with 500 gal.

Scipio Discovery Well Finaled at Lower Depth

Clifford A. Perry finally has bottomed out his Trenton oil-discovery

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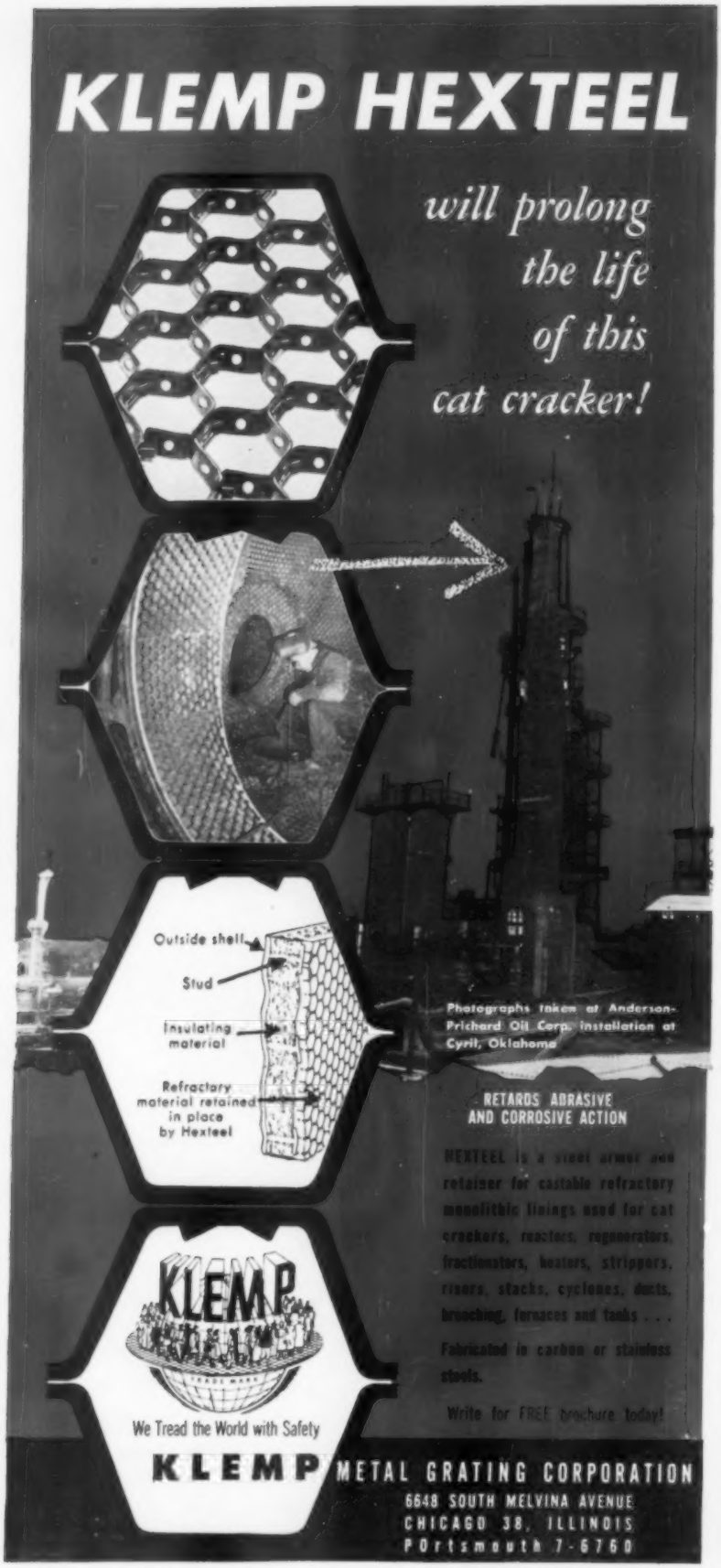

well in Scipio Township, Hillsdale County, at 3,891 ft. and completed it at that depth averaging 150 bbl. of oil per day natural. The well is his 1 Houseknecht, in the NW SE NE 10-5s-3w.

In the meantime, Aurora Gasoline Co. and McClure Oil Co. have drilled a successful Trenton oil producer at the diagonal northwest 20-acre offset location to Perry's discovery well. The latter companies are starting another well in the pool with location in the SE SW NE 10-5s-3w.

NEVADA

Old Dry Hole Reentered

Mid-Central Drilling Co. of Oklahoma City has reactivated 1 Vorhees, a 3,467 ft. dry hole drilled by J. D. Blalock in the Battle Mountain region of Lander County in April 1956. Mid-Central plans to run 6-in. casing and test at zone at 1,385 ft.

NEW MEXICO

SOUTHEAST NEW MEXICO

Northern Lea County Wildcat Flows Oil

Northern Lea County got another Permo-Pennsylvanian discovery at Texas Pacific Coal & Oil Co. 1 J. P. Collier, 8 miles southeast of Caprock.

After acidizing with 1,000 gal. at 10,005-76 ft., the well flowed 461 bbl. of oil in 21 hours through 20/64-in. choke, and was completed at the rate of 531 bbl. a day. This section had made a small flow of oil on initial drill-stem tests.

Location of the well is in 10-11s-33e, 4 miles north of Bagley field. It was started as a Devonian exploration, projected to 12,000 ft. Total depth is 11,750 ft.

Humble Oil & Refining Co. 1 Ault heirs, wildcat in 27-15s-36e, logged slight oil and gas shows on a drill-stem test in the Pennsylvanian. The 30-minute test was run at 10,824-85 ft. Recovery was water blanket cut with gas, plus 10 ft. of oil and gas-cut mud. Drilling continued on an 11,500-ft. contract.

OKLAHOMA

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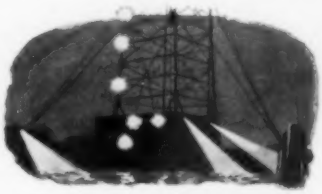

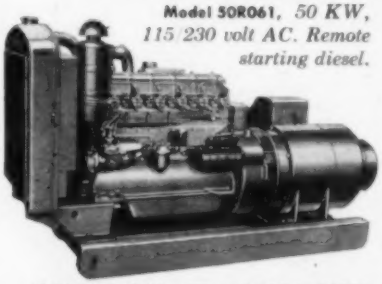

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mark, evidence of the new deep drilling campaign getting under way.

Beckham County . . . Shell Oil Co. has a wildcat in this western county at total depth 12,998 ft. The 1 Boyd is located in C NW NW 15-9n-22w. Operator is conditioning hole at 10,600 ft.

Caddo County . . . A state drilling-depth record was set at Magnolia Petroleum Co.'s 1 Sterba-Ordovician in this southwestern county at 18,339 ft. The wildcat is in the Cement area of SW NE SW 35-6n-10w. Drilling is currently below the above depth and may go on to 20,000 ft.

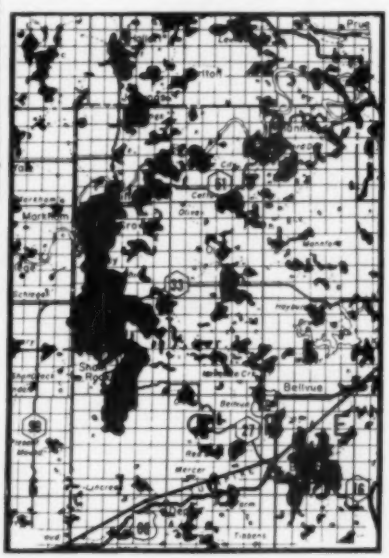
Grady County . . . The biggest number of ultra-deep tests are in the Carter-Knox field area of Grady and Stephens counties.

British-American Oil Producing Co. has its 1 Harrison-B in C W½ NE NE 28-3n-5w down to 14,143 ft. and is still going. The 1 Baker in SW SW NE 33-3n-5w is below 12,811 ft.; the Pan American Petroleum Corp. 1 Mitchell in NE NE SW 34-3n-5w is drilling at 13,737 ft.; and Sinclair Oil & Gas Co. 1 Cudd in C NE NE 14-5n-5w is drilling below 10,823 ft.

Stephens County . . . British-American's 1 Krieger in C SW SW 3-2n-5w, Carter-Knox field, is conditioning hole with total depth at 16,605 ft. The Oil Creek zone was found at 16,385 ft. The 1 Brickel in C SW NE 4-2n-5w is drilling below 13,458 ft.

Research Report Issues Oil Industry Road Atlas

Research Oil Reports of Oklahoma City and Tulsa has recently published a road atlas of Oklahoma that shows



oil and gas fields and principal roads. The map, 32-in. by 44-in., is large enough to be used as a wall map. Sections, townships, and ranges are clearly defined. The principal highways are shown in red and identified as to number. Oil and gas fields are shown in green and red. respectively.

The reproduction shows a portion of the new map covering parts of Creek, Lincoln, and Payne counties, the area adjacent to the fabulous Cushing oil field.

ROCKY MOUNTAINS

MONTANA

Champlin Refining Co. and Republic Natural Gas Co. opened a new Amsden-basal Penn field on the Montana Plains at their 2 Government, 1 mile west of Ivanhoe Dome production, separated by dry holes. The well flowed oil at the daily rate of 320 bbl. from the lower Bench of the Amsden "B" sand at 4,130 ft. This is the second Amsden discovery of importance this year on the Plains.

NEBRASKA

New Oil Field Indicated In Kimball County Test

A drill-stem test, open 1 hour, in Pan American Petroleum Corp.'s Gehrke wildcat 2½ miles south of Bushnell, in Kimball County, filled 5,440 ft. of free oil to indicate the dis-

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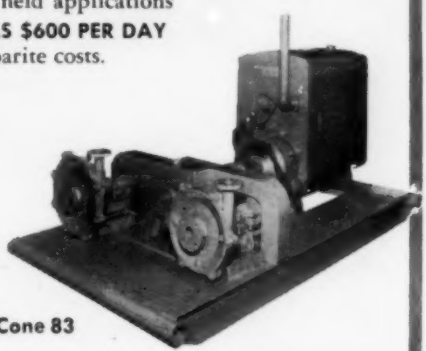

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covery of another "J" sand field for the Denver-Julesburg basin.

The test took in the pay from 6,982 to 7,004 ft. where cores had sand and shale with good stain and odor, and good porosity and permeability.

The drill-stem test recovery was with 60 ft. of oil-cut mud, 120 ft. of mud, and 300 ft. of water. Flowing pressure reached 613 psi. Shut-in pressure after 23 minutes was 719 psi.

The discovery is about 4½ miles north of Hoskovec field, nearest production.

NORTH DAKOTA

Blue Buttes Wildcat Tests Good Oil Flow

The Texas Co. appears to have another oil discovery in McKenzie County. It's 1 Lovaas, in the C NW NE 6-150n-95w, a mile south of Blue Buttes field, in the northeastern part of the county, flowed oil during a drill stem of the Madison at 9,315-62 ft.

Flow was not gaged but started after the tester had been open 2¼ hours. Recovery when pipe was pulled included 60 ft. of mud and gas-cut oil and 110 ft. of salt water. Flowing pressure was 635 to 1,560 psi.

A previous test from 9,275 ft. with bottom at 9,315 ft. got 998 ft. of oil and 328 ft. of mud and gas-cut oil. Recovery in cores from 9,237 to 9,362 ft. included 76 ft. of limestone bleeding oil and gas. Operators at latest report were coring ahead.

WYOMING

Farmers Union Central Exchange located a southeastern offset to the Parkman discovery well of Dead Horse Creek field in Campbell field in Campbell County, Powder River basin. The 1 Government-Haberland is ½ mile from the 1 Ferguson-Government discovery which pumped 329 bbl. of oil daily from Parkman at 6,968-7,088 ft.

To the east Shell Oil Co. has a Parkman well at 14-18 Edwards; ½ mile northeast Shell has another one drilling at 13-18 Maycock, and The California Co. 1 Government-Davis about 1½ miles southeast of the field discovery well will test the Parkman. Parkman is of Mesaverde-Upper Cretaceous age.

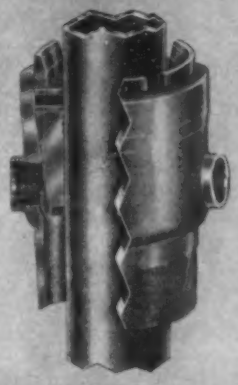
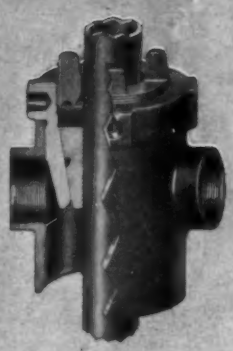


FIG. 91

Simplicity and compactness, for ease of installation and neatness of hook-up, are incorporated into the Larkin Casing Head (2000 psi test, 1000 psi working pressure.) It is designed to provide a safe and economical means of suspending and packing off casing strings. This head has been tested to support 225,000 lbs., equivalent to 5600' of 7", 20-lb. casing with a safety factor of 2.



TYPE L

A new member of the Larkin Well Head line, the Type L Tubing Head fills a need in low pressure areas where economy may be effected with complete safety. It is forged steel construction, full opening, 2000 lb. psi, top of body threaded 7" API to accommodate control equipment, hinged three-segment slips, 2" or 3" side outlets.

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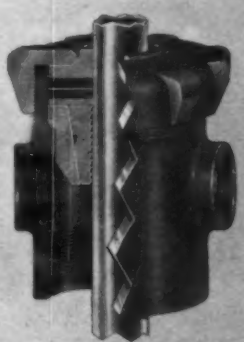
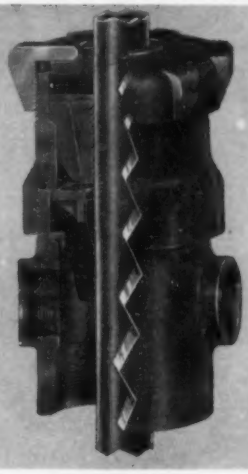
TYPE R

The Larkin Type R Tubing Head is a conversion from the Type SR Head. This ease of conversion makes it possible to use the same stripper adapter and Neoprene stripper when working on any well equipped with a Larkin Tubing Head.



TYPE SR

The Larkin Type SR Tubing Head is a slip suspension head, equipped with a Neoprene Stripper which serves as a blow-out preventer and oil saver while tubing is being pulled or run. It is very suitable where higher pressures might be encountered.



For detailed information on these and other Larkin Tubing and Casing Heads, please refer to your Larkin Catalog or talk to your Larkin Representative. All Larkin Equipment is available through your supply store.

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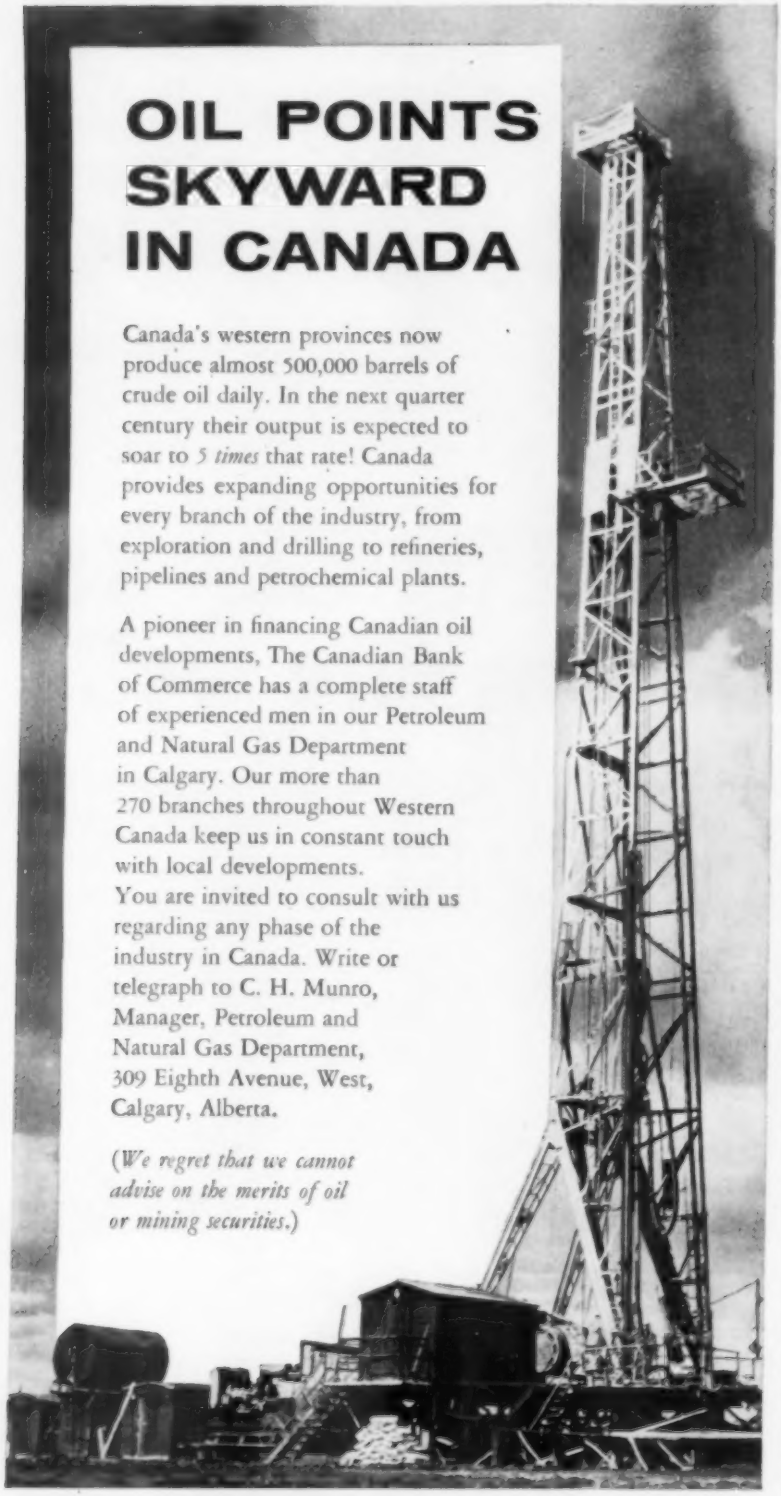
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TEXAS

TEXAS PANHANDLE

Lipscomb County Wildcat Flows Morrow Gas

The Texas Co. 1 J. A. Barton, wildcat located 6 miles northwest of Higgins townsite in southeastern Lipscomb County, had prospects of a gas discovery. Operators ran a 2-hour test in the lower Morrow at 10,578-10,735 ft. which flowed gas at the rate of 1,830 M.c.f. per day. Flowing pressure ranged from 1,060-1,160 psi. and 30-minute shut-in pressure reached 4,710 psi. Recovery was water blanket and 256 ft. of gas-cut mud with no shows of oil or formation water.

The well is 9 miles southeast of gas production in Miller field, in Section 525, Block 43, H&TC Survey.

WEST TEXAS

Andrews Opener Makes High Flowing Potential

Continental Oil Co. 1 T. F. Teague, Andrews County Wolfcamp discovery 3 miles southeast of Andrews, has been completed for a calculated daily potential of 1,345 bbl.

The strike is 2½ miles south of South Means (Wolfcamp) field, and about the same distance north of Wolfcamp production in Wemac field. Location is Section 1, Block A-44, PSL Survey.

The potential figure was based on a 6-hour flow of 336.17 bbl. of oil, with no water, through ½-in. choke, from perforations at 8,783-8,823 ft. Tubing pressure was 435 psi. Gas-oil ratio was 1,300:1.

On earlier tests, 1 Teague flowed up to 100 bbl. an hour through 1-in. choke. The well also indicated lower Wolfcamp production when it recovered free oil at 9,350-92 ft.

Crane County prospect . . . Ellenburger oil in the western portion of Sand Hills, West field was a possibility at Gulf Oil Corp. 31 W. A. Estes, Section 23, Block 20, PSL, 10 miles northeast of Grandfalls.

A 3-hour drill-stem test at 8,000-30 ft. had gas in 45 minutes and recovered 1,200 ft. of clean, 39°-gravity oil. Operators were running electrical surveys.

Location of the well is 2 miles southeast of Ellenburger production in Crawar field, and 4½ miles west of the Ellenburger area in Sand Hills, West field.

Gaines County opener . . . Signal Oil & Gas Co. has completed its 1 Ford

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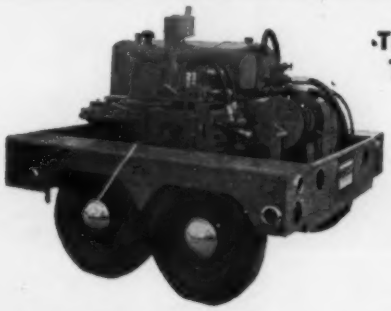

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as a Devonian discovery. The well, which has been in the testing stage for some time, pumped 247 bbl. of 41°-gravity oil from perforations at 9,110-30 ft.

Location is 25 miles southwest of Seminole, in Section 25, Block A-10 PSL Survey.

Upton County . . . Hunt Oil Co. 1-67 Amacker, an Ellenburger wildcat in the center of Upton County, should make a Wolfcamp or Pennsylvanian discovery if the lower formations are dry.

A drill-stem test in the Wolfcamp at 9,249-9,316 ft. recovered 280 ft. of oil-cut mud and 800 ft. of clean oil.

A test at 9,975-10,032 ft., tentatively identified as Pennsylvanian Strawn, had gas in 7 minutes and recovered 1,000 ft. of oil plus 140 ft. of oil-cut mud.

Projected depth is 13,200 ft., to test the Ellenburger. Location is in Section 67, Block C, CCSD&GRNG Survey. The well is 12 miles northwest of Rankin, and 3 miles east of Wolfcamp and Strawn production in Amacker-Tippett field.

Pure Oil Co. TXL, wildcat 9 miles northeast of Crane, in northwestern Upton County, swabbed and flowed 42 bbl. of new oil after recovering load and acid residue from treatments in the Strawn at 9,757-75 ft. Location is in 27-42-5s, T&P Survey.

Winkler extensions . . . Operations in Winkler County last week included a second well in a new pool, and a discovery or long extension in the Halley area.

Humble Oil & Refining Co. 5 Waddell Brothers, in 2-40-PSL Survey, was assured of Fusselman production on the basis of a test at 9,700-49 ft. Oil flowed in 1 hour, and a 2-hour gage tanked 61.5 bbl. of 31-gravity oil. An additional 23 bbl. of oil was reversed out of the drill stem.

Gulf Oil Corp. 1-I Sealy-Smith Foundation, 1½ miles south of Halley multipay field, logged additional pay in the Devonian when it flowed oil while testing at 9,855-9,905 ft. Oil surfaced in 2 hours and 35 minutes, flowed an unestimated amount to tanks for 25 minutes, then gaged 57 bbl. of 36-gravity oil in 3 hours. Drilling continued on a 12,200-ft. contract. The well also flowed oil on test at 9,800-55 ft.

TEXAS GULF COAST

Deeper Oil Pay Opened In East Taft Discovery

The Texas Co. has a deeper-pay oil-discovery in the East Taft area, 5 miles northeast of Taft, in San Patricio County. Its 1 Ritchie, in Block 12, J. A. McKee Survey, flowed 177 bbl. of 42.3°-gravity oil per day through ⅛-in. choke at completion in its 6,300-ft. Frio pay, perforated at 6,309-22 ft. Flowing pressure is 1,330 psi., and gas-oil ratio 1,422 cu. ft. per barrel. Hole was drilled to 9,500 ft. Previous production in the area has been from a 5,600-ft. sand.

Goliad County Wildcat Completed as Gasser

A wildcat drilled by Clardy & Barnett, of Dallas, just east of Goliad, in Goliad County, has been found gas-productive to open up a new field.

The well is rated good for 12,300,000 cu. ft. of gas per day, open flow, with production from a relatively shallow sand, perforated at 3,725-28 ft.

Location is about 2 miles northeast of La Bahia gas field, discovered in 1948, where production has been from a 5,500-ft. Yegua sand.

Shallower Sand Produces In Offshore Chevron Field

The new sand in which Standard Oil Co. of Texas has just completed its latest well in its Chevron field, off the coast of Kleberg County in the

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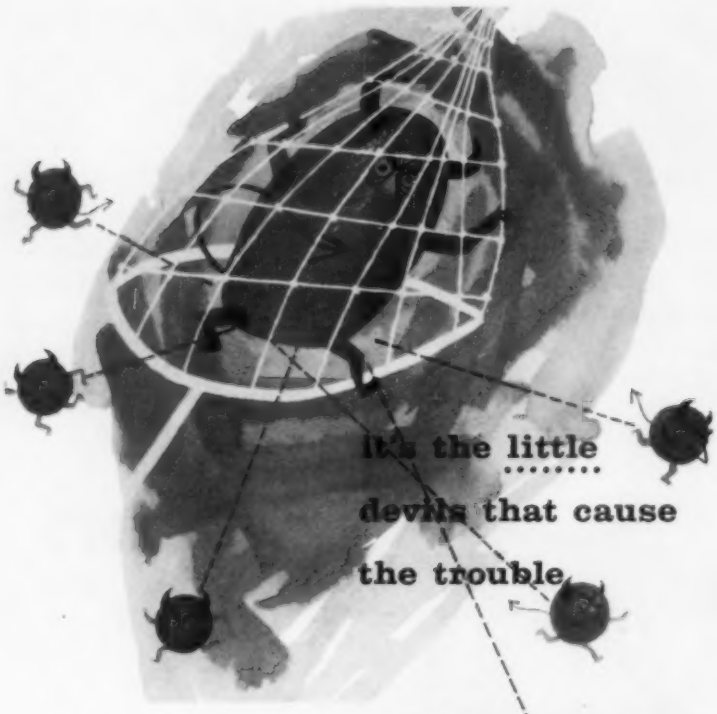
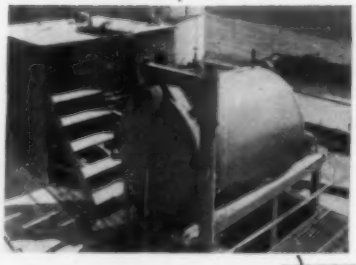


In water flooding, almost any treatment will remove the larger solids. However, the microscopic hellions — algae and bacteria, particularly the sulphate-reducing bacteria — are what really play hob with the flood zone. And conventional treatment lets most of them through. But Dicalite filtration nets them securely, because Dicalite filteraids can filter out particles smaller than the wave length of visible light, particles so small you can't see 'em with a microscope!



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These brines contain both oil and colloidal clay, 110 to 170 ppm, which must be removed before disposal in open streams to avoid water pollution in this populated beach resort. This completely unitized Atlas "Filtreat" unit, using Dicalite 'Speedplus' with a precoat filteraid, removes all contaminants, including algae and 97-99% of all bacteria, from 4,700 bbls./day. This unit features automatic operation, including controls for precoating and body feed, in a space only 10'x24', including the platform. The operator visits the installation only once or twice a day. Cost of operation — about 1/10¢ per barrel! Write for information.

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Gulf of Mexico, is the shallowest so far opened in this offshore field.

The sand, perforated at 6,827-47 ft., is productive of gas and condensate. Flow, during a 3-hour test through ¼-in. choke, was at the rate of 1,100,000 cu. ft. of gas and 32 bbl. of 58.7°-gravity condensate per day with pressure of 2,125 psi.

The well was drilled from a stationary platform on the far east (Gulfward) side of the field. Location is about 3 miles from shore.

Chevron, discovered in 1954, is Texas' largest offshore field to date. More than 15 wells have been completed with oil, condensate and gas production from a multiplicity of Miocene and Frio sands ranging in depth to below 9,500 ft.

Refugio County Wildcat Uncovers New Gas Area

Sun Oil Co. is opening a promising new gas area in the extreme southern part of Refugio County.

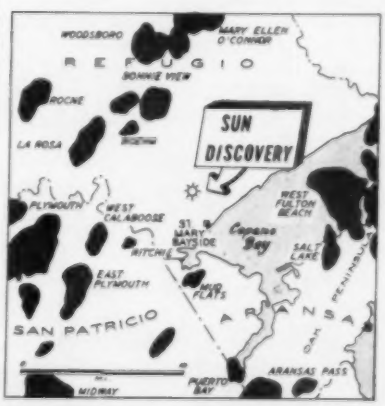
Its discovery well, 1 Frank Palfrey, is about 2½ to 3 miles northwest of St. Mary Bayside, on the north shore of Copano Bay, northwestern arm of Aransas Bay.

Location is only a few miles north of the juncture point of Aransas and San Patricio counties.

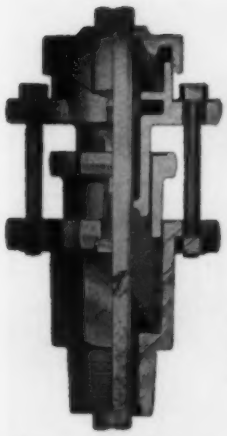
Sun's well has an open-flow potential of 14,000,000 cu. ft. of gas daily, yielding 57.3 bbl. of 68.8°-gravity condensate per 1,000,000 cu. ft. Shut-in pressure is 3,160 psi.

Its pay is perforated at 7,302-05 ft. Hole to 8,927 ft. was drilled by P. H. Welder. Sun, which took over operation at that point, deepened it to 9,988 ft.

The well is in the heart of an area in which numerous important oil and/or gas fields have been found. Included are such fields as Aransas Pass, Fulton and West Fulton Beach, Woods-



JUNCTURE area of Refugio, Aransas, and San Patricio counties where Sun Oil Co. has a promising new gas discovery (indicated).



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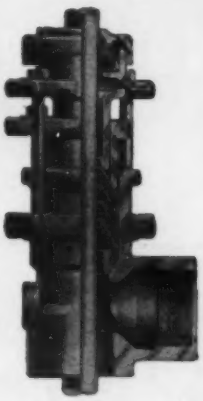

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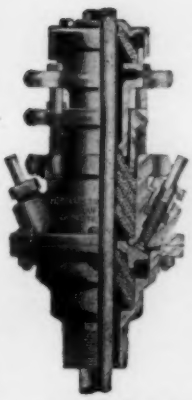
A combination Stuffing Box and Pumping Tee. Makes a short connection. Bolt lugs are placed low to eliminate fouling of elevator links. No bell nipple needed as top of body will support elevator. Full opening — unnecessary to remove body when pulling or running rods.



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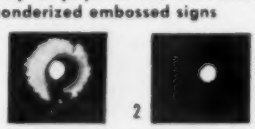

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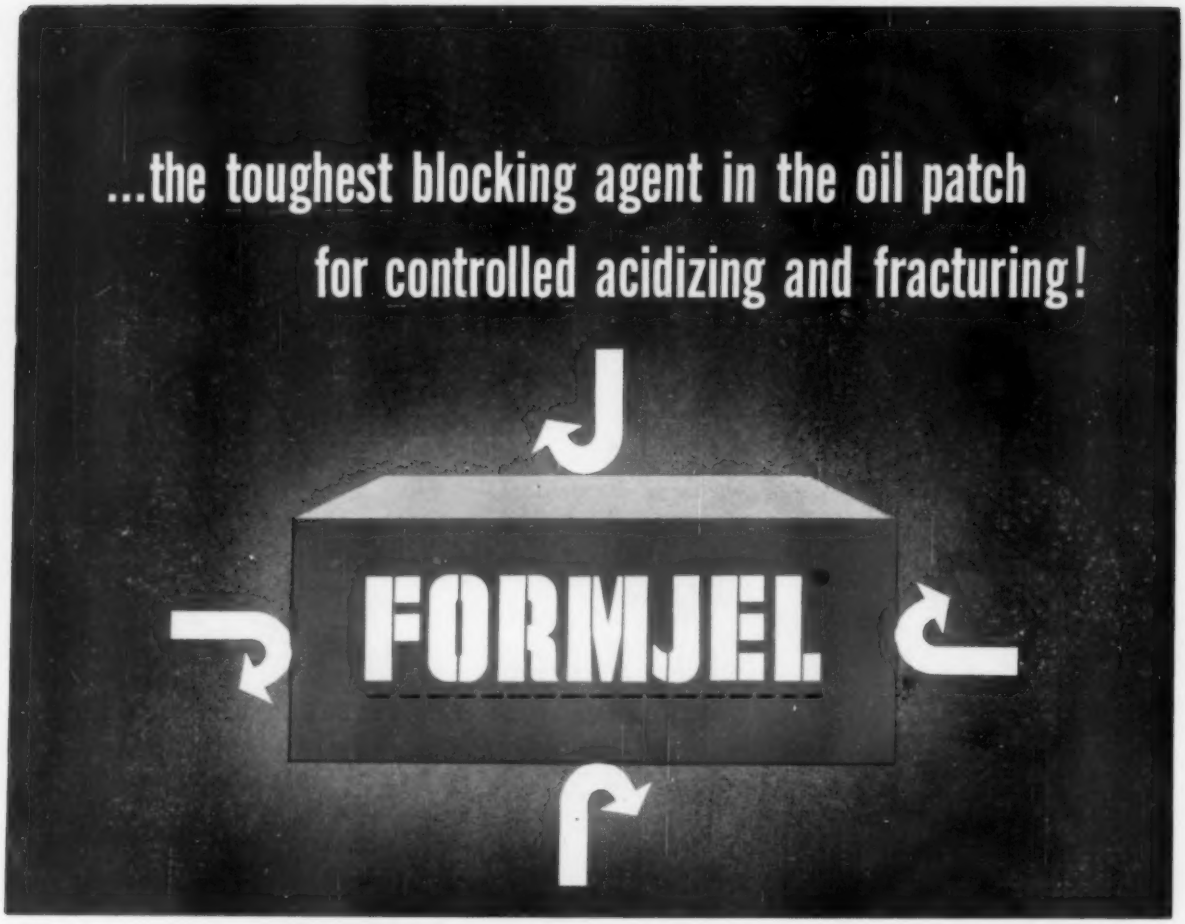

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boro, Mary Ellen O'Connor-Refugio, La Rosa, Plymouth and West Plymouth, and others.

SOUTHWEST TEXAS

Gasser Opens New Field In Southeast Duval County

"Independence" is the name of a newly discovered gas area in southeastern Duval County.

Its discovery well, 1 Celestina de Benavides, drilled by Farenthold & Pitcairn, is rated good for 4,000,000 cu. ft. of gas per day, open-flow.

PORTION of southeastern Duval and southwestern Jim Wells counties showing location of Farenthold & Pitcairn's new gas discovery, designated as Independence field.

Flow through 9/32-in. choke was at the rate if 2,100,000 cu. ft. per day with pressure of 1,063 psi. Shut-in pressure is 1,406 psi.

The well, drilled to 4,810 ft., is productive from perforated interval at 3,152-60 ft.

Location is less than a mile from the Jim Wells County line, and about 8 miles northwest of Premont, in the latter county. It is about 5,100 ft. northeast of gas production in Rios field, and about 3 miles northwest of Premont field. Spot is in SK&K Survery 26.

WASHINGTON

Late Reports Dampen Hope for New Oil State

Reports, or lack of them, last week had cast a shadow on Sunshine Mining Co.'s 1 Madina, rank wildcat in Grays Harbor County, Washington.

Drilling was halted at 4,130 ft., where operators were running 5½-in. casing. Electrical surveys were run and a second formation test was understood to have been made, but all operations were "tight" and unconfirmed.

Oil companies on the West Coast have taken a wait-and-see attitude,

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kills vegetation...
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pointing out the nearby tests which showed for producers for a while.

Last week the well was reported to have flowed 48°-gravity oil at the rate of 400 bbl. a day while drill-stem testing the Nye, of Lower Miocene age, at 3,940-63 ft. If successful, the well would be Washington state's first commercial oil production.

Successful Wildcats

CALIFORNIA

Los Angeles County: Nordon Corp., Ltd., B-2 Aeco-Bonsall-Crawley, SW NE 7-2s-12w, TP 648 BOPD, 36°, 5,378-5,488 ft., TD 5,674 ft. (New Myer zone fault block discovery in Bandini field.)

SOUTH LOUISIANA

Lafourche Parish: Lone Star Producing Co. 2 Godchaux, 33-15s-18e (northeast of Raceland). IP 176 BOPD, 9/64-in., 37.5°, GOR 567 cu. ft. per bbl., TP 4,425 psi., perforations 13,386-13,415 ft. TD 14,171 ft. (New field.)

Bateman Drilling Co. 1 South Shore, 36-16s-19e. IP 200 BOPD, ¼-in., 51.2°, GOR 30 M.c.f. per bbl., perforations 10,898-10,916 ft. TD 11,065 ft. (New pay in Raceland field.)

Olin Gas Transmission Corp. 6 Grandison, 14-19s-23e. IP 5,275 M.c.f. daily and 172 BCPD, 9/32-in., 53°, TP 3,650 psi., perforations 13,190-13,200 ft. TD 15,680 ft. (Extension and new pay in Coffee Bay field.)

St. James Parish: Union Oil & Gas Corp. 1 Falgoust et al, 23-13s-17e. Shut-in gas well, no gage, perforations 11,272-78 ft. TD 11,700 ft. (Second well and new pay in Lower Vacherie field.)

St. Landry Parish: Sohio Petroleum Co. 1 Fontenot et al, 19-5s-5e (3 miles south of Washington field). IP 360 BOPD, ⅛-in., 45.7°, GOR 3,060 cu. ft. per bbl., TP 2,600 psi., perforations 9,964-70 ft. (Cockfield). TD 11,354 ft.(New field.)

MICHIGAN

Hillsdale County: Clifford A. Perry L. Houseknecht, NW SE NE 10-5s-3w. IPF 150 BOPD, Trenton 3,563 ft. (top). TD 3,891 ft. (New pool.)

MISSISSIPPI

Franklin County: Serio-Punches Oil Co. 1-D U.S.A., 9-5n-2e. IP 69 BOPD, 3/32-in., 38°, GOR 300 cu. ft. per bbl., TP 370 psi., perforations 4,694-95 ft. (Wilcox). TD 6,999 ft. Elev. 257 ft., Wilcox 4,458 ft., base Baker shale 6,201 ft. (New field—Richardson Creek.)

SOUTHWEST TEXAS

Duval County: Farenthold & Pitcairn 1 Celestina de Benavides, SK&K Sur. 226, A-1524 (8 miles northwest of Premont). IP 4,000 M.c.f. daily, open-flow potential, dry gas, SITP 1,406 psi., perfs. 3,152-60 ft. TD 4,810 ft. (New field—Independence.)

L. G. Shelly 1 Herbst, H&GN Sur. 69, A-303 (5 miles east of Freer). IPP 18 BOPD, 28°, perfs. 2,794-2,801 ft. (Loma Novia). TD 3,112 ft. (New field.)

Starr County: Wood Brothers & Langham 1 F. B. Guerra Estate, Share 25-B, Santa Cruz Grant (3½ miles southeast of Delmita). Shut-in gas well, no gage, perfs. 5,498-5,503 ft. TD 6,520 ft. (Extension and new pay in La Reforma area.)

Maverick County: Sutton Producing Co. 2-C Ewing Halsell, Section 29, Block 11, I&GN Sur., A-970 (20 miles southeast of Eagle Pass). IPP 59.58 BOPD, 28°, perforations 1,230-35 ft. (Olmos 2-B sand). TD 1,235 ft. (New field.)

TEXAS GULF COAST

Orange County: W. V. Bowles & Co. 9 Peveto, William Dyson Sur., A-10 (1 mile southeast of Orange field). IP 74 BOPD, ⅛-in., 24.6°, GOR 341 cu. ft. per bbl., TP 405 psi., perforations 3,772-77 ft. (Miocene). TD 5,193 ft. (New reservoir in Orange field.)

San Patricio County: The Texas Co. 1 Ritchie, Lot 7, Sec. 12, Third Addition to Taft Farm Lands, John McKee Sur., A-189. IP 176.92 BOPD, ⅛-in., 42.3°, GOR 1,440 cu. ft. per barrel, TP 1,275 psi., perf. 6,309-22 ft. (Frio). TD 9,500 ft. (New pay in East Taft field.)

Seaboard Oil Co. 12-A Welder Estate, Sec. 12, Eliza H. Welder Subd. (7 miles northeast of Sinton). IP 5,700 M.c.f. daily, open-flow potential (3,844 M.c.f. daily and 64 BCPD, 56°, ¼-in.), perf. 6,794-97 ft. (Frio). TD 7,300 ft. (New pay in Encino field.)

LEGAL

Sealed bids will be received until July 31, 1957, 2:00 P.M., Mountain Standard Time, and opened at that time in the Office of the Superintendent, Crow Indian Agency, Crow Agency, Montana, for the leasing of 2,267.20 acres of Tribal land located in Township 1 N., R. 36 E.; T. 3 N., R. 34 E; and T. 3 N., R. 35 E., Big Horn and Treasure Counties, Montana, for oil and gas mining purposes. The details of the lease offering and how and where to file bids may be obtained by addressing the inquiry to the Superintendent of Crow Indian Agency, at Crow Agency, Montana.

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WRITE OR CALL TODAY! One of the D & S sales engineers will call on you to show tremendous TRI-DIA Bit and Core Barrel advantages.

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OFFICES IN ALL PRINCIPAL OIL AREAS

In Monterey's Jerry O'Brien:

TIPRO Has Another Fighter

"YOU'VE picked the right man again."

That's the way a Washington attorney summed up the selection of Jerome J. O'Brien as president of the Texas Independent Producers and Royalty Owners Association earlier this year.

The remark followed O'Brien's hard-hitting acceptance speech, which looked to observers like a tipoff that the new president would continue, maybe even surpass, the energetic activities which have marked past TIPRO presidents.

O'Brien lost no time in bearing out this feeling. Already one of the biggest voices in what is probably TIPRO's biggest fight, O'Brien immediately jumped into the battle against imports with the ferocity of a tiger protecting its young.

This month the association appears closer than ever before to winning its battle.

O'Brien, whose office is atop the 21-story Milam Building in San Antonio, is vice president and manager of Mid-Continent oil operations for Monterey Oil Co.

Though he has the fire and spirit of a grass-roots Texas oil man, O'Brien became in his words "an incurable Texan" in a roundabout way.

Two degrees . . . He was born in Spalding, Neb., October 6, 1906. He received his B.A. degree in geology from the University of California at Los Angeles in 1932, then went across town to the University of Southern California for his B.S. in petroleum engineering.

It was a variety of jobs and half a dozen years later before he finally came into contact with Texas. And then it was for only a brief span. It happened while he was with Sunset Oil Co. of Los Angeles, the company with which he launched his real start in oil.

Jerry—most people don't even know his name is Jerome—joined Sunset in 1936 when he was 30. His first job was as a rotary helper, but only 6 years later he was chief geologist. On the way up he was petroleum engineer, geologist, and manager of Texas operations.

During World War II, O'Brien left Sunset to go with Franco Oils, Ltd., in Canada as the U. S. stepped up its search for wartime petroleum supplies. He was consulting engineer for Franco.

O'Brien got his real "baptism of fire," the tempering process which toughened him up for the ranks of independent producers, when he went into business for himself in 1943, a partner in Shamrock Drilling Co. of Los Angeles.

JEROME J. O'BRIEN

. . . A strong brand of ammunition.

Texas at last . . . He made his last job change, and his permanent contact with Texas, in 1948, when he joined Jergins Oil Co. as manager of Texas and Oklahoma operations.

During the next 9 years he was to become executive vice president of Jergins and an officer in successor companies, first as president of Monterey Exploration Co. and later in his present capacity as vice president of Monterey Oil Co.

In 1939 O'Brien married the former Mary Heno Payne of New Orleans. The couple has an adopted son, 23-year-old Thomas, who is studying social sciences at the University of California at Los Angeles.

Jerry, according to his wife, never goes around "tooting his own horn." But as every Texas independent oil man knows, he doesn't hesitate to "sound off" in carrying oil's banner. He gets along well with people, making some concessions when necessary, but holding the line tenaciously on things he considers really important. As he puts it:

"There are differing interests that cannot be reconciled and some views that can't be brought together. If another man, another company, another segment of the industry, or a government bureau is trying to cut your throat, you can't just smile and say, 'Well, I'll let you cut it a little bit for the sake of harmony.' That can be fatal to an industry, a country, or a way of life."

O'Brien has always been ready to fight for those principles. When TIPRO handed him the job of leading the organization, it only gave him a stronger brand of ammunition to fire.

John C. Maher has been assigned to set up a new stratigraphic section for Pure Oil Co. in Tulsa. Maher was with United States Geological Survey and Shell Oil Co. before joining Pure.

E. L. Claridge has been transferred by Shell Oil Co. from the Amsterdam laboratories of Royal Dutch-Shell to Houston, where he will be assistant chief research technologist. **R. A. Wilson** has been named assistant chief research chemist for Shell in Houston, and **Stanley Marple** and **Norman E. Duncan** of the Houston lab have been reassigned. Marple will go to Amsterdam, Duncan to New York.

J. H. McClintock and **A. A. Sanders** have been appointed senior chemical engineers in Humble Oil & Refining Co.'s technical service division. **J. A. Snyder** and **E. L. Wilson** have been promoted to senior research chemical engineers in the research division of Humble's Baytown, Tex., refinery.

Phil T. Pafford, formerly with Allied Chemical & Dye Co., has been appointed research analyst in Continental Oil Co.'s Houston petrochemical department.

J. D. BEHLING

J. D. Behling has been named West Texas division chief engineer for Service Pipe Line Co. in Lubbock, Tex. Behling has been assistant supervisor of oil movements for the company in Tulsa. **M. C. McNichol,** oil traffic engineer for Service in Lubbock, has been transferred to Tulsa to succeed Behling.

Harry A. Schroth, general superintendent of Montana-Dakota Utilities Co.'s pipeline and production department, has been appointed division manager at Billings, Mont. He succeeds **J. E. Moore,** who will retire December 31 after more than 35 years in the oil and gas industry. Moore will continue as a director of the company.

Personals

H. P. CALDWELL

Hamilton P. Caldwell, Jr., manager of the Socony Mobil Oil Co., Inc., East Providence, R. I., refinery, has been appointed manager of the company's Augusta, Kans., refinery. He succeeds **J. S. Glass,** who has retired. Caldwell will be replaced at East Providence by **Joseph E. Penick,** supervisor of light oil operations in the manufacturing department. **B. H. Templeton,** assistant manager of process promotion division, moves up to succeed Pennick in light oil operations.

H. G. Hagler has been appointed area foreman in Service Pipe Line Co.'s Snyder, Tex., district. **H. E. McKinley** has been named area foreman in Willamar, Tex.

W. M. Elmer, president of Texas Gas Transmission Corp., has been named a director of Independent Natural Gas Association of America. He will fill out the term of the late W. T. Stevenson.

Newton L. Abramson has been appointed associate chemist for Cities Service Research & Development Co. in Cranbury, N. J.

Donald J. Kahn, James Christakes, and **Gordon C. Edwards** have joined Esso Research & Engineering Co.'s products research division. **Edwin A. Schmall, Albin F. Turbak,** and **Hadden Clark** have joined Esso in chemicals research.

Clifford V. Shireman has been appointed refining superintendent for The California Co. Shireman joined the company in 1946 as engineer. Since that time he has been refinery foreman, research engineer, project engineer, general foreman, and refiner.

William I. Powell, Washington attorney, will join Independent Petroleum Association of America in Washington August 1. Powell has been with American Mining Congress in Washington for 8 years.

Wade Moore, acting division geologist for Murphy Corp. in Billings, Mont., has been appointed division geologist. **Harry Freeman** has been transferred from El Dorado, Ark., to Poplar, Mont., as production foreman.

R. H. Westhoff, Pan American Petroleum Corp.'s central division gas-engineering supervisor, has been appointed central division gas superintendent, a new position. Westhoff has been with Pan American and its predecessors since 1929. He has been gas-engineering supervisor since 1951.

Milhail Lazarovici has been named chief petroleum engineer of North Canadian Oils, Ltd. Lazarovici was formerly division reservoir and production engineer with Colorado Oil & Gas, Ltd.

David E. Gee, former member of the executive committee of Cheyenne Oil Corp. and exploration manager for Westland Oil Development Corp., has opened consulting offices in Wichita Falls, Tex. Gee was exploration manager of Ada Oil Co.'s northern division and vice president of Ada's Canadian subsidiary before joining Westland Oil.

Lester T. Potter has been elected president of Lone Star Gas Co. Potter has been executive vice president since 1954. He succeeds **D. A. Hulcy,** who will continue as chairman of the board. Hulcy was named president in 1940 and became chairman in 1952. Potter joined Lone Star in 1928 immediately after receiving his degree in mechanical engineering from Texas A. & M. College. He was named assistant production engineer at Dallas in 1931, superintendent of the production engineering department in 1938, and superintendent of the combined production and production-engineering departments when they were merged in 1941. In 1945 he was promoted to assistant to the general superintendent of the transmission division. Potter was named assistant to the president in 1947 and executive vice president in 1954.

L. T. POTTER

D. A. HULCY

Dr. Eugene P. Whitlow has been appointed chairman of the department of chemistry and chemical engineering of the Southwest Research Institute, San Antonio, Tex. Whitlow steps up from a post as manager of chemical-engineering research. He had been serving as acting chairman of the department since mid-March.

S. T. Algermissen has joined Sinclair Research Laboratories, Inc., in Tulsa. He will do geophysical research. Algermissen is a graduate of Missouri School of Mines at Rolla, Mo., and recently received his Ph.D. degree in geology and geophysics from Washington University at St. Louis. While at Washington he held the Sinclair Fellowship in geophysics.

Gail Rutter, gas engineer with The Texas Co., has been transferred to Tulsa from New Orleans.

Ian K. MacGregor has joined Climax Molybdenum Co. as vice president in charge of eastern operations.

Harry M. Becker and **Chester R. Jones** have been appointed production foremen in Shell Oil Co.'s Billings, Mont., division.

Lt. Gen. Ernest O. Thompson, senior member of the Texas Railroad Commission, has retired as ranking officer of the Texas National Guard.

Jerry R. Kyle has been appointed division exploration manager in Oklahoma City for Carter Oil Co. Kyle was formerly division geologist. He succeeds **Richard S. Hicklin,** recently transferred to Denver as northern division exploration manager. **E. S. Conway** will succeed Kyle as division geologist.

L. F. Ivanhoe has resigned from Franco Western Oil Co. to become a consultant in Bakersfield, Calif. Ivanhoe was with Standard Oil Co. of California before joining Franco Western.

E. L. Snider has joined Blackwell Oil & Gas Co. as district engineer in Cushing, Okla.

Walter Cline, exploration geologist in Midland, Tex., for Cities Service Oil Co., has joined Strouder Drilling Co. in Evansville, Ind.

Robert J. Carter, district manager for Stone & Webster Engineering Corp. in Houston, has been appointed special assistant to the managing director of Stone & Webster's English subsidiary, E. B. Badger & Sons, Ltd., of London.

Marshall K. Kern, geologist with Pan American Petroleum Corp., has been transferred to Jackson, Miss., from Bismarck, N. D.

Oklahoma City Petroleum Club's First Officers

Harry J. Schafer, Sr., president of Schafer Oil Co., fourth from left, will head Oklahoma City's new Petroleum Club during its first year. The club is scheduled to open its $400,000 quarters August 26. Other officers include, left to right, W. M. Decker, Cities Service Oil Co., assistant secretary; John Kirkpatrick, Kirkpatrick Oil Co., treasurer; John Melton, British-American Oil Producing Co., secretary; R. B. McCloy, Decem Drilling Co., Big-X Drilling Co., first vice president; and T. T. Rogers, Halliburton Oil Well Cementing Co., second vice president. Not pictured are W. T. Payne, Big Chief Drilling Co., third vice president; and H. D. Christner, Continental Oil Co., assistant treasurer.

James F. Bade, junior exploitation engineer with Shell Oil Co., has been promoted to exploitation engineer in the Billings, Mont., division.

Vern D. Curry, Jr., mechanical engineer in Shell Oil Co.'s Midland, Tex., production division, has been transferred to Denver as division mechanical engineer.

Arnold C. Hayden and **Thomas Herndon,** staff geologists with Alex W. McCoy Associates, Inc., in Tulsa, **James E. Johnson,** staff geologist in Denver, and **R. Gordon Humphries,** manager of the Calgary office, have been elected directors of the company.

E. W. Rogers, district engineer at Oklahoma City for British - American Oil Producing Co., has been appointed field superintendent in the company's new Marlow, Okla., office. **John C. Thrash** moves up as district engineer in Oklahoma City succeeding Rogers. **Jack L. Sherrod** has been named field engineer for the southern Oklahoma area, and **Jeff Callahan** will be senior drilling foreman.

Lewis R. Pomeroy III, former Continental Oil Co. production foreman in Benavides, Tex., has joined Eastern States Petroleum Co. as a petroleum engineer in Houston.

Joseph P. Fagan has joined The Texas Co. as chemist at the Beacon, N. Y., research center.

Marshall Black has been promoted by Humble Oil & Refining Co. from senior petroleum engineer in Houston to supervisory petroleum engineer in Los Angeles.

Bill M. Gillman has joined Ohio Oil Co. as associate petroleum engineer in Hobbs, N. M.

Sam L. Roberson, executive vice president and treasurer of El Dorado Refining Co., has been elected president. Roberson succeeds **George J. Peterschmidt,** who has taken early retirement. Peterschmidt has been with El Dorado since 1923. He became president in 1956. Roberson joined the company as production engineer in the Russell, Kans., district in 1948. He was vice president in charge of manufacturing before becoming executive vice president. **Harold J. Datin** has moved up from refinery superintendent to vice president in charge of manufacturing. Datin joined the company in 1922, has been refinery superintendent since 1953. **Lawrence McKinney,** assistant treasurer of the company, has been promoted to treasurer. El Dorado is a subsidiary of Petro-Atlas Corp. of Tulsa.

Personals

I. C. (Bill) McCormick has been transferred by Urice Drilling Co. from Plains, Tex., to Fort Worth as tool pusher.

David P. Tate has been named senior chemist in the chemical and physical research division of Standard Oil Co. (Ohio) in Cleveland.

DEATHS

J. E. Duff, 79-year-old oil operator, died in his Houston office July 24. Duff was a banker at Beaumont during the early days of the Spindletop boom, and later became one of the state's leading independent oil men. He was a partner of the late Hugh Roy Cullen when Cullen made his first oil strike in Pierce Junction field near Houston.

E. C. (Bud) Clark, 43, division production superintendent for P. C. Lake, Inc., in Shawnee, Okla., died July 19 in Shawnee after a heart attack.

Walter C. Kerrigan, 64, assistant to the president of International Nickel Co. of Canada, Ltd., and International Nickel Co., Inc., died July 16 in New Brunswick, N. J.

Roger Motheral, 53, Gulf Coast manager for Petroleum Engineer, died July 20 in Houston after a long illness. Motheral joined the magazine in 1938. He was later vice president of Gulf Publishing Co. before rejoining Petroleum Engineer 2 years ago.

Russell Brinneman, Bartlesville, Okla., educational program director for Phillips Petroleum Co.'s supply and transportation department, died July 21 in Tulsa. He was 61.

Edwin Morris Gearke, 41, Baash-Ross Tool Co.'s Mid-Continent regional sales manager, died July 16 in Houston. He had been with Baash-Ross 8 years.

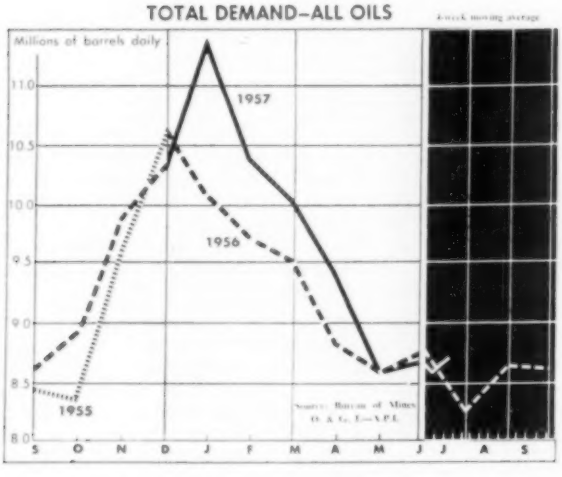
Charles W. Ihrig, 83, Tulsa oil man who retired in 1944 from the old Mid-Continent Petroleum Corp., died July 23 in Tulsa.

Thomas J. Garin, 45, director of information for Pennsylvania Grade Crude Oil Association, died July 22 in Oil City, Pa. A former newspaper man, Garin joined the association in 1944. He was a director of the Middle District Oil Producers Association and curator of the Drake Well Park Museum.

Latest Figures . . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,933,600	UP	100,300	DOWN	173,823
Crude stocks	280,458,000	UP	1,478,000	UP	5,326,000
Completions	1,124	UP	113	DOWN	53
Refinery runs	7,749,000	DOWN	223,000	DOWN	327,000
Gasoline stocks	178,267,000	DOWN	3,706,000	DOWN	85,000
Kerosine stocks	29,627,000	UP	374,000	UP	1,258,000
Distillate stocks	129,798,000	UP	4,234,000	UP	21,064,000
Residual stocks	48,314,000	UP	1,294,000	UP	6,150,000
Four-product stocks	386,006,000	UP	2,196,000	UP	28,387,000
Total imports	1,470,500	DOWN	171,000	UP	418,400



Higher Demand and Lower Production Are Firming Gasoline Markets

PETROLEUM-product markets are drifting in two directions depending upon what part of the stream you are in.

The gasoline market has a better tone. Demand is up, removing the pressure that has been due to distress material.

Light and heavy-fuel markets are soft. Stocks are high. Summer buying is below normal. And, prices are down.

Two major oil companies announced further cuts in refinery operations for July. Esso Standard Oil Co. is reducing July runs by an average of 23,000 bbl. daily. Socony Mobil Oil Co. cut runs by 31,000 bbl. daily in addition to the reduction from the shutdown of the East St. Louis plant which has been closed by a strike since early in June.

Operating committees of many companies are taking another look at the summer refining program. In most cases the question will be what changes should be made to prevent a burdensome accumulation of product stocks.

In recent weeks gasoline stocks haven't been as troublesome as surplus kerosine and distillate fuels.

Part of the trouble in the gasoline market seems to have been caused by what looks like a shift in some vacation driving this year. Since the end of World War II, June has been the peak gasoline month. Total demand for gasoline in June 1956, was 234,000 bbl. daily above May and 309,000 bbl. daily above July.

The gasoline outlook this year is for a demand gain in July over June. If so, it will be the first such shift since 1952 when the June refinery strike influenced both supply and demand. The peak gasoline week so far this year was for the period ended July 12. Total gasoline demand for that week, based on preliminary data, averaged a little over 4,500,000 bbl. daily.

Refinery production of gasoline for the past few weeks has been slightly less than last year. With demand up and production down gasoline stocks should show a satisfactory decrease this month. They went down only 500,000 bbl. in July last year.

The improvement in the general gasoline situation hasn't gone far enough to result in price increases, but it has removed some of the distress material.

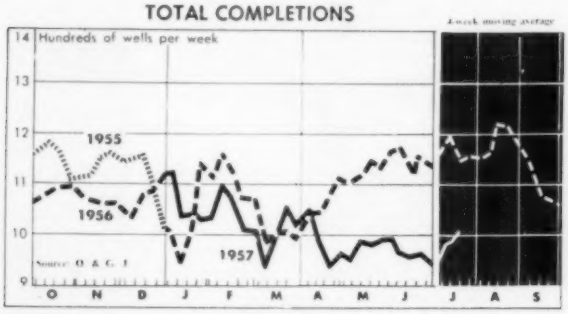
The downward adjustment in high-octane premium on the Gulf Coast was due to a temporary surplus of this material. The manufacturing cost differential between regular and premium is high enough to push the premium price back up when stocks are adjusted.

Distillate markets have softened in July. Both consumers and distributors seem to be waiting for the lowest price of the summer. No. 2 fuel is freely available on the Gulf Coast at 9.0 cents a gallon. While there have been no actual reports of lower prices, it would be a safe bet that a buyer with a tanker ready to load could find plenty at 8.75 cents.

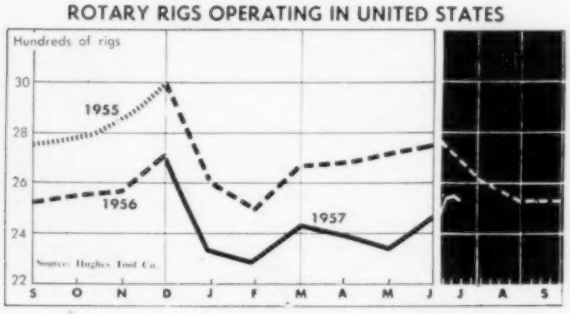
In the Group 3 area, there have been rumors of No. 2 prices as low as 8.125 cents a gallon. Any private brand distributor can buy No. 2 at 8.50 cents plus pipeline transportation charges.

Total residual stocks climbed to 48,314,000 bbl. on July 19 or only 200,000 bbl. below last year's peak which came at the end of November. Weak prices reflect this surplus.

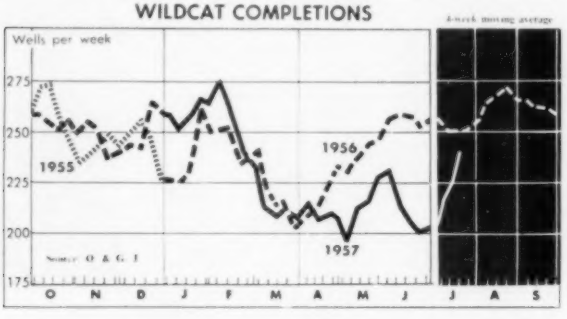
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS*

Area—	7-22-57	7-15-57	7-23-56
North Central and East	112	112	132
Southeast	40	39	33
Okla., Kans., Ark., Mo.	461	480	457
Louisiana	435	437	444
North and East Texas-Panhandle	370	378	373
Gulf and South Texas	203	202	266
West Texas-New Mexico	538	536	487
Rocky Mountain	259	262	266
Pacific Coast	105	102	123
Total United States	2,523	2,548	2,581
Canada	200	211	265

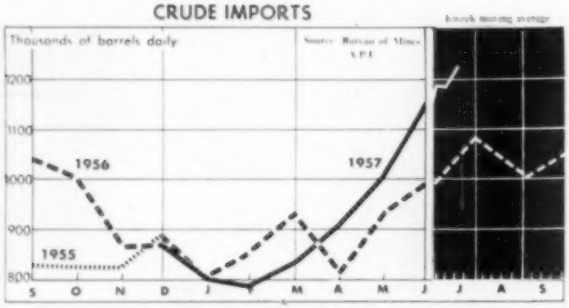
*Hughes Tool Co.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 20, 1957

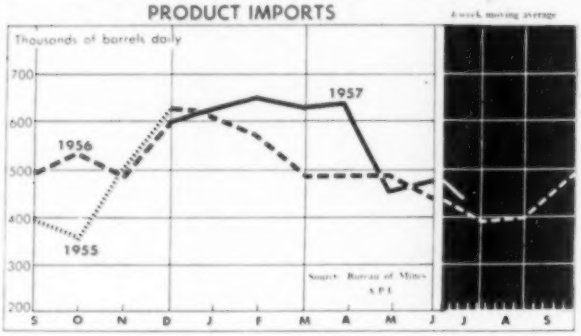
	Total wells							Cumulative		Total wildcats					Cumulative	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1957	1956	Total	Crude	Cond.	Gas	Dry	1957	1956
Alabama	1	1	0	0	0	0	11,427	53	‡60	0	0	0	0	0	14	‡28
Arkansas	27	14	0	0	13	0	81,144	573	440	5	0	0	0	5	104	103
California	41	29	0	0	12	0	165,259	1,169	1,212	8	1	0	0	7	287	268
Colorado	20	3	0	3	14	0	100,651	469	652	14	1	0	1	12	316	319
Illinois	41	12	0	1	28	0	95,779	1,328	2,060	18	0	0	0	18	338	393
Indiana	7	4	0	0	3	0	10,013	329	341	2	0	0	0	2	68	72
Kansas	83	38	0	10	34	1	296,670	2,297	2,851	17	4	0	0	13	457	601
Kentucky	17	2	0	5	10	0	34,286	744	948	3	0	0	0	3	149	218
Louisiana	60	33	1	4	22	0	486,865	2,070	2,153	14	3	0	1	10	376	419
North	18	10	0	1	7	0	86,481	705	870	5	1	0	0	4	96	130
South	33	20	1	3	9	0	330,494	966	1,029	8	2	0	1	5	231	244
Offshore	9	3	0	0	6	0	69,890	399	254	1	0	0	0	1	49	45
Michigan	17	5	0	6	6	0	51,698	225	254	3	1	0	0	2	89	89
Mississippi	8	2	0	0	6	0	71,303	209	247	6	1	0	0	5	108	112
Montana	16	5	0	1	10	0	83,047	212	200	7	0	0	0	7	74	63
Nebraska	28	10	0	0	18	0	162,960	460	577	16	2	0	0	14	258	280
New Mexico	55	32	0	17	6	0	278,961	1,152	1,056	3	2	0	0	1	150	131
Northwest	29	11	0	17	1	0	131,591	447	411	1	1	0	0	0	53	36
Southeast	26	21	0	0	5	0	147,370	705	645	2	1	0	0	1	97	95
New York	9	4	0	0	0	5	9,250	250	.....	0	0	0	0	0	2	.....
North Dakota	11	5	0	0	6	0	67,462	153	133	6	0	0	0	6	62	37
Ohio	19	10	0	3	6	0	46,890	579	551	0	0	0	0	0	5	6
Oklahoma	111	54	2	7	42	6	361,720	3,391	4,792	15	3	0	1	11	390	510
Pennsylvania	32	13	0	5	4	10	71,401	385	†627	1	0	0	0	1	36	†15
Texas	488	272	12	13	190	1	2,012,779	11,948	12,237	132	12	1	1	118	3,017	3,147
District 1	23	7	0	0	16	0	59,388	684	*1,800	14	0	0	0	14	238	*604
District 2	23	4	1	2	16	0	134,422	404	*1,481	14	1	0	0	13	160	*475
District 3	32	16	3	1	12	0	215,301	997	.....	12	1	1	1	9	290	.....
District 4	27	9	3	2	12	1	120,171	780	.....	11	1	0	0	10	274	.....
East	33	17	1	0	15	0	158,473	693	620	9	1	0	0	8	213	238
District 7-B	88	44	0	0	44	0	271,967	1,561	.....	24	3	0	0	21	569	.....
West	133	110	1	1	21	0	643,323	3,399	3,200	16	4	0	0	12	502	530
District 9	98	45	1	0	52	0	293,100	2,658	*4,418	32	1	0	0	31	714	*1,238
District 10	31	20	2	7	2	0	116,634	772	718	0	0	0	0	0	57	62
Utah	3	1	0	0	2	0	17,226	105	72	0	0	0	0	0	58	42
West Virginia	12	1	0	8	3	0	28,464	342	354	1	0	0	0	1	16	13
Wyoming	15	6	0	2	3	4	58,044	443	437	7	2	0	1	4	148	120
Miscellaneous‡	3	0	0	0	3	0	17,920	57	63	3	0	0	0	3	40	55
Total U. S.	**1,124**	556	15	85	441	27	4,621,219	28,943	32,317	**281**	32	1	5	243	6,562	7,041
Total prev. week	1,011	438	8	96	438	31	4,044,881	.....	.....	238	9	1	11	217	.....	.....
Cum. 1957	28,943	15,125	245	2,114	10,842	617	120,834,678	.....	.....	6,562	708	59	260	5,535	.....	.....
Western Canada	96	67	0	6	23	0	406,638	1,672	1,549	18	4	0	3	11	452	.....

*Districts: 2 & 3, 1 & 4, 9 & 7-B, formerly combined. †Incl. New York. ‡Incl. Florida, South Dakota, and Washington.

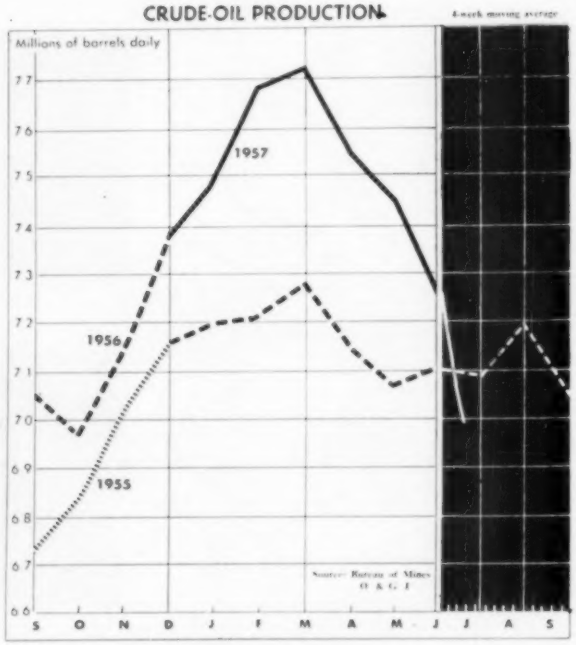
CRUDE IMPORTS



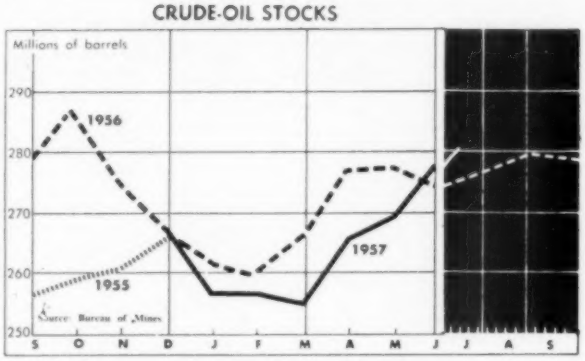
PRODUCT IMPORTS



CRUDE-OIL PRODUCTION



CRUDE-OIL STOCKS



DAILY AVERAGE PRODUCTION FOR WEEK

	July 20, 1957			July 13
	Crude oil	Lease condensate	Total	total
Alabama	13,650		13,650	12,350
Arkansas	84,100	300	84,400	83,650
California	926,800		926,800	925,200
Colorado	152,250		152,250	148,900
Eastern	51,700		51,700	52,400
Florida	1,350		1,350	1,350
Illinois	151,800		151,800	161,300
Indiana	27,700		27,700	28,200
Kansas	†363,000		†363,000	†315,300
Kentucky	39,400		39,400	39,600
Louisiana	797,000	74,700	871,700	876,750
North	125,000	2,700	127,700	132,750
South	672,000	72,000	744,000	744,000
Michigan	27,400		27,400	26,000
Mississippi	110,150	4,200	114,350	114,350
Montana	72,650		72,650	72,700
Nebraska	49,650		49,650	50,350
Nevada	100		100	100
New Mexico	250,100	4,400	254,500	256,900
North Dakota	39,300		39,300	34,900
Oklahoma	†601,000		†601,000	†544,400
Texas	2,741,000	53,700	2,794,700	2,794,700
Dist. 1	52,000	450	52,450	52,450
Dist. 2	126,000	8,450	134,450	134,450
Dist. 3	400,000	26,500	426,500	426,500
Dist. 4	210,000	6,100	216,100	216,100
Dist. 5	36,000	300	36,300	36,300
Dist. 6	122,000	6,300	128,300	128,300
East Texas field	173,000		173,000	173,000
Dist. 7-B	151,000	50	151,050	151,050
Dist. 7-C	140,000	3,650	143,650	143,650
Dist. 8	1,025,000	1,100	1,026,100	1,026,100
Dist. 9	201,000	500	201,500	201,500
Dist. 10	105,000	300	105,300	105,300
Utah	10,500		10,500	10,000
Wyoming	285,600		285,600	283,800
Others	‡100		‡100	‡100
Total U. S.	6,796,300	137,300	**6,933,600**	6,833,300
Change from previous week, up			**100,300**	
Canada	†567,400		†567,400	†464,750

Total U. S. production, January 1-July 20 ..... 1,499,939,000 bbl.
Same period last year (crude plus cond.) ..... *1,445,841,100 bbl.

*Includes 25,286,400 bbl. condensate. †Week ended previous Monday. ‡South Dakota.

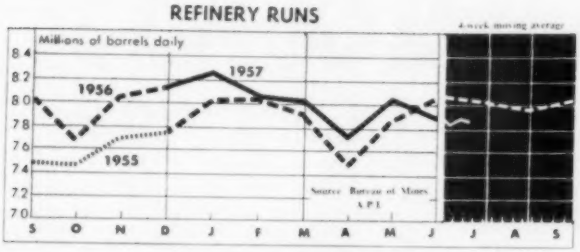
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

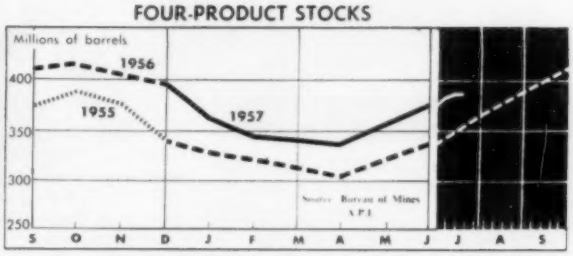
	7-13-57	7-6-57	7-14-56
Pennsylvania Grade	2,905	2,851	2,583
Other Appalachian	1,492	1,501	2,348
Illinois, Indiana, Michigan	10,263	10,652	10,849
Nebraska, North Dakota	2,264	2,627	2,280
Kansas	11,135	10,743	8,916
Oklahoma	22,047	21,596	27,208
Arkansas	2,532	2,536	3,051
Louisiana	18,922	18,831	15,623
North	3,013	2,893	2,660
South	15,909	15,938	12,963
Mississippi, Alabama, and Florida	2,642	3,447	3,044
New Mexico	8,643	8,632	8,314
Texas	128,314	128,472	119,923
East Texas proper	10,946	11,450	8,940
West Texas	63,305	60,800	58,350
Texas Gulf	23,901	24,646	21,488
Other Texas	30,162	31,576	31,145
Wyoming	17,560	17,446	19,637
Other Rocky Mountain	6,419	5,923	7,340
California	28,195	28,084	27,529
Foreign	†17,125	15,639	16,487
Total	280,458	278,980	275,132

*Bureau of Mines. †Includes 4,397,000 bbl. in California.

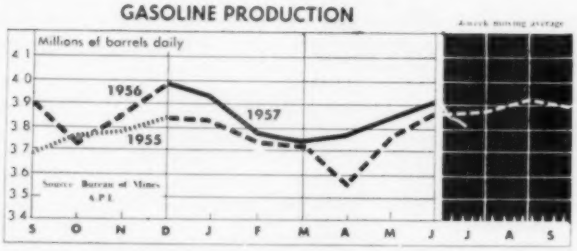
REFINERY RUNS



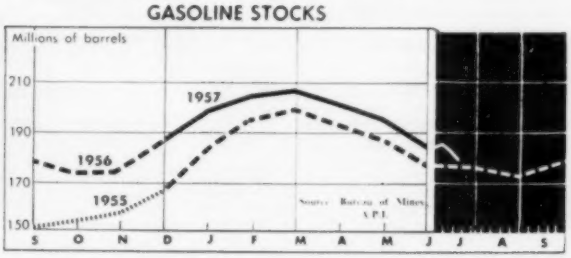
FOUR-PRODUCT STOCKS



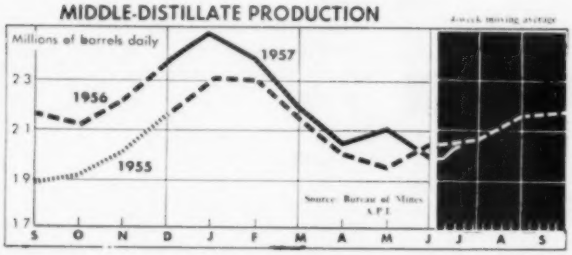
GASOLINE PRODUCTION



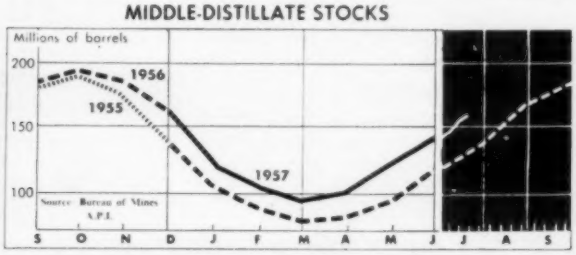
GASOLINE STOCKS



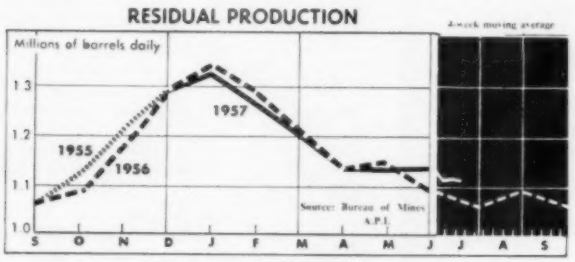
MIDDLE-DISTILLATE PRODUCTION



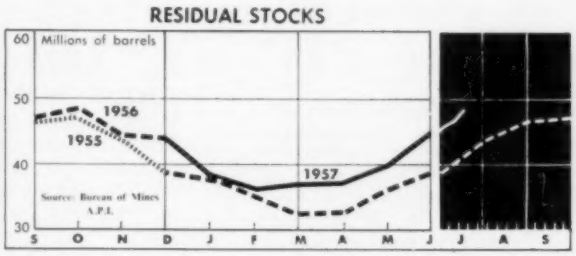
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, JULY 19, 1957

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, July 1956—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,196	480.3	31.0	304.3	213.6	41,219	11,710	45,545	12,193	1,164	472.5	26.2	313.4	196.9
Appalachian:														
District 1	101	48.0	2.4	21.0	4.9	4,511	530	2,659	526	107	42.2	4.4	24.2	5.5
District 2	49	29.9	2.1	7.4	7.6	2,458	525	838	240	100	53.3	4.6	14.3	11.9
Ind., Ill., Ky.	1,234	652.3	48.4	254.1	152.4	31,540	5,742	19,074	6,183	1,375	718.2	79.7	261.4	144.5
Minn., Wis., Dak.	106	47.1	8.7	30.0	10.3	5,512	1,282	6,291	418	92	46.7	7.2	24.3	4.0
Okla., Kans., Mo.	745	402.6	10.3	152.1	26.6	15,174	1,522	11,639	1,046	724	390.6	18.7	162.9	27.3
Inland Texas	283	181.4	5.2	58.9	22.3	7,055	401	2,475	1,877	273	193.9	10.1	42.8	24.3
Texas Gulf Coast	1,786	911.1	65.0	471.3	235.1	24,262	3,129	15,303	6,881	1,914	926.5	91.5	479.9	251.1
La. Gulf Coast	678	367.0	55.7	182.6	53.3	10,265	3,181	6,944	1,600	713	359.7	39.7	181.9	40.9
N. La. and Ark.	86	29.0	5.9	19.4	6.1	3,702	922	1,976	147	103	37.9	6.8	22.9	6.2
Rocky Mountain:														
New Mexico	25	13.0	0.7	5.0	2.4	413	12	100	66	25	13.0	0.3	4.7	3.6
Other Rocky Mtn.	278	134.0	2.6	59.7	35.7	6,738	278	2,933	1,073	281	131.7	2.5	67.1	27.9
California	1,182	485.6	7.3	155.3	306.7	25,418	393	14,021	16,064	1,143	491.3	4.1	167.1	321.6
July 19, 1957	7,749	3,781.3	245.3	1,721.1	1,077.0	178,267	29,627	129,798	48,314	8,014	3,877.5	295.8	1,766.9	1,065.7
July 12, 1957	7,972	3,837.3	250.3	1,857.1	1,105.6	181,973	29,253	125,564	47,020	.....	.....	.....	.....	.....
July 20, 1956	8,076	3,850.6	294.7	1,822.9	1,124.0	178,352	28,369	108,734	42,164	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):	
Regular (89 octane)	11.25-11.75
Premium (98 octane)	14.00-14.50
Gulf Coast (cargoes for coastwise or export movements):	
Regular (90 octane)	11.00-11.50
Regular (92 octane)	11.25-11.75
★ Premium (97 octane)	12.75-13.25
★ Premium (98 octane)	13.00-13.50
California (rack):	
Regular (88 octane)	13.1
Premium (96 octane)	15.1
Premium (98 octane)	15.8
Caribbean area (cargoes):	
Regular (87 octane)	10.875
Premium (93 octane)	11.75

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

NATURAL GASOLINE*

Group 3:	
Grade 26-70	4.0
Breckenridge:	
Grade 26-70	3.5

*If 26-70 natural is considered as 100 per cent, prices for lower-vapor-pressure grades increase 2.5 per cent for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):	
★ Kerosine 42-44	9.50-10.00
★ Diesel oil (58 d.i. and above)	9.125-9.75
★ Distillate No. 1	9.125-9.75
★ Distillate No. 2	8.50-9.00
Gulf Coast (cargoes):	
Kerosine 41-43	9.125-9.75
Distillate No. 2	9.00-9.50
New York Harbor (barges):	
Kerosine 41-43	11.15
Distillate No. 2	10.65
Diesel fuel, 48-52 d.i.	10.95
Caribbean area (cargoes):	
Distillate No. 2	9.25

WAX (I.B.)

Oklahoma (Group 3):	
132-135 A.m.p. (semi-refined) in tank cars	6.50
New York (export):	
126-130 A.m.p. crude-scale (solid in bags or barrels)	7.35

★Denotes change from previous week.

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):	
Residual fuel (max. 1% S)	$1.85-2.10
Gulf Coast (cargoes):	
★ Bunker C fuel	$2.50-2.75
New York Harbor (barges):	
Bunker C fuel	$3.05
Caribbean (cargoes):	
Bunker C	$2.55
California (rack):	
Bunker C fuel, Los Angeles	$2.85-3.00

LUBRICATING OILS

Mid-Continent (Group 3):	
150-160 bright stock, solvent refined, 0-10 p.p., 95 v.i.	25.5
200 vis. neutral oil, solvent refined, 0-10 p.p., 95 v.i.	22.25
Pennsylvania Grade:	
145-155 vis. at 210, bright stock, 8 color, 25 p.t.	28
200 vis. neutral (180 at 100°), 25 p.t.	26

CRUDE-OIL PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.	Mid-Cont.*	Gulf Coast Tex.†	West Tex.‡ N.M.	Wyo. (sour)
14-14.9	$2.67				
15-15.9	2.71				$1.89
16-16.9	2.74				1.94
17-17.9	2.78				1.99
18-18.9	2.82				2.04
19-19.9	2.85				2.09
20-20.9	2.89	$2.75		$2.62	2.14
21-21.9	2.93	2.77		2.64	2.19
22-22.9	2.97	2.79		2.66	2.24
23-23.9	3.01	2.81	$3.44	2.68	2.29
24-24.9	3.05	2.83	3.46	2.70	2.34
25-25.9	3.09	2.85	3.48	2.72	2.39
26-26.9	3.13	2.87	3.50	2.74	2.44
27-27.9	3.17	2.89	3.52	2.76	2.49
28-28.9	3.22	2.91	3.54	2.78	2.54
29-29.9	3.27	2.93	3.56	2.80	2.59
30-30.9	3.32	2.95		2.82	2.63
31-31.9	3.38	2.97		2.84	2.67
32-32.9	3.44	2.99		2.86	2.71
33-33.9	3.50	3.01		2.88	2.75
34-34.9	3.56	3.03		2.90	2.79
35-35.9	3.61	3.05		2.92	2.83
36-36.9	3.65	3.07		2.94	2.87
37-37.9	3.68	3.09		2.96	2.89
38-38.9		3.11		2.98	2.91
39-39.9		3.13		3.00	2.93
40 and up		3.15		3.02	2.95

*Includes Oklahoma, part of Kansas, North Dakota, West Texas (sweet) and North Central Texas. †Low cold test Gulf Coast. ‡Sour.

Effective dates: California January 17, 1957, east of California, January 3-January 10, 1957; Pennsylvania Grade, January 16, 1957.

Some crudes in North Central Texas and West Central Texas, are on the intermediate schedules.

FLAT PRICES

Louisiana:	
Bienville (distillate)	$3.05
Ville Platte	3.45
Texas:	
East Texas	3.25
Conroe	3.53
Van	3.08
Pennsylvania Grade:	
Bradford	4.88
Middle District	4.70
Southwest Pennsylvania	4.41
West Virginia	4.23
Buckeye Grade	4.23
Zanesville Grade	3.27
Illinois Basin	3.15
Canada:	
Leduc-Woodbend	2.78
Redwater (Alta.)	2.67
Smiley (Sask.)	2.44
Pembina	2.65

FOREIGN

Venezuela:	
Cumarebo, 48°-49.9°, Tucupido	3.75
San Joaquin, 41°-41.9°, Puerto La Cruz	3.34
Oficina, 35°-35.9°, Puerto La Cruz	3.05
Tia Juana medium, 26.5°-26.9°, Amuay*	2.55
Quiriquire, 16.5°-16.9°, Caripito	2.45
Lagunillas heavy, flat, Amuay or Las Piedras*	2.38
Bachaquero, flat, Las Piedras*	2.23

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes, f.o.b. lifting port):	
Arabian, 36.0°-36.9°, Ras Tanura	$2.12
Iranian, 34.0°-34.9°, Bandar Masur	2.04
Iranian, 34.0°-34.9°, Abadan	1.99
Iraq, 36.0°-36.9°, Fao	2.00
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.85
Qatar, 41.0°-41.9°, Umm Said	2.23
Middle East, E. Mediterranean:	
Arabian, 36.0°-36.9°, Sidon	2.69
Iraq, 36.0°-36.9°, Tripoli, Banias	2.69
Far East (cargoes, f.o.b. Lutong, Sarawak):	
Seria Light, 37°	2.75

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(Latest reported spot fixtures)

★ Carib.-U.S.N.H., dirty (USMC—50%)	$1.35
★ Gulf-U.K., clean (Scale—30%) (26s. 11d.)	3.78
★ Carib.-U.K., dirty (Scale—25%) (24s. 5d.)	3.42
★ P.G.-Japan, dirty (USMC—35%)	5.85
★ Sidon-U.S.N.H., dirty (USMC—60%)	3.12

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FINANCIAL CONTACTS. Underwriters, Brokers, Private Finders of Capital reached. No shopping. Confidential. FREE ENTERPRISE ASSOCIATES, 817 51st St., Brooklyn, N. Y.

WANTED

WANTED—Oilfield sales and service organization to act as manufacturers representative for production equipment. Distributorships now available for California and Oklahoma. Box K-243, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Oil Royalty, Gas Royalty, and working interests Texas, Oklahoma. A'Mell Oil Properties, 1201 Elm, Dallas, Texas. RIverside 1-9251.

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CAN DELIVER 1,000 to 5,000 bbls. crude oil daily, low grade or regular in tank cars or in pipe line at Wyoming points. Producer, P. O. Box 2362, Denver, Colorado.

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CONSULTING PETROLEUM ENGINEER: Desires management and supervision of oil properties in Oklahoma. 32 years experience in drilling and production, 20 years as Petroleum Engineer and Production Superintendent. Can furnish best of references. BEST ENGINEERING, 805 SW 50th Street, Oklahoma City 9, Okla. Phone: MElrose 4-5604.

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2—12' x 45' Storage Tanks, 25#
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1—Poly Reactor, 550#, 24" x 28'.

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3 Pacific ITB, 400 gpm.—2,000' hd. 735 gpm—3,100' hd.
8 Pacific SVTB, 612 gpm—600' hd. 324 gpm—480' hd, 308 gpm—516' hd, 193 gpm—389' hd.
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BJ hot oil pump 3 x 9, 13 st, 325 gpm, 4600' hd.

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1 Worth LTC-6 800 hp.
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1—U-34 Powered by Twin GK 145 Torque Converter Drive—Gardner-Denver Pump FXK with two Compounded Buda MD970 Lee C. Moore 96′ Mast—4,500′ 4½—16.6# DP and misc. equipment to complete rig.

1—U34 with WAK Torque Converter drive—Gardner-Denver FXK with NKU—127′ Lee C. Moore Mast with 8′ substructure. 4,500′ 4½—16.6# Drill pipe and misc. equipment to complete rig.

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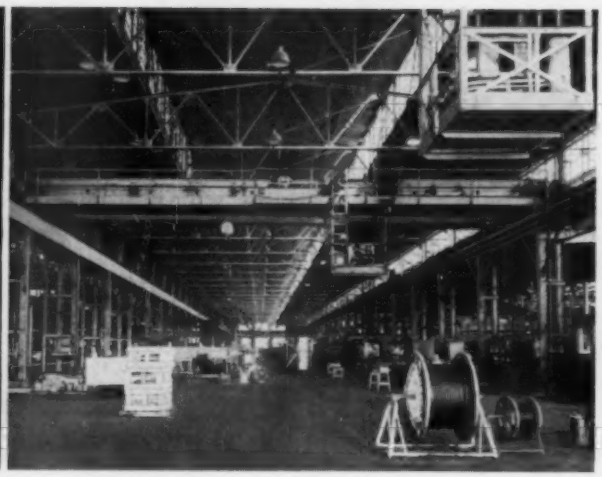

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Immediate openings with major oil company for graduate engineers with experience in drilling, production, reservoir and equipment; also geophysicists experienced in interpretation and supervision. Working knowledge of Spanish desirable but not essential.

Liberal Employe Benefit Plans. Salary commensurate with experience.

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Box K-287, The Oil and Gas Journal, Tulsa, Oklahoma

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GEOLOGIST: Eleven years experience as Chief Geologist, and Manager of Exploration for Independent and Major, in United States, Latin America. Qualified to manage all phases, Petroleum Exploration, Development, Evaluation. Desires responsible position in the United States or Foreign Country. Box K-272, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT—B.B.A., 3½ years experience with C.P.A. firm. Four years experience with independent oil companies, 2 years as office manager and accounting supervisor. Would relocate. Box K-283, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST-ENGINEER. Desires responsible position with substantial independent oil company or drilling contractor. Six years diversified experience including subsurface mapping and interpretation, field development, well site setting, and completions. Capable of evaluating and screening drilling prospects. Presently employed. Resume on request. Box K-278, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER. AGE 36. Eleven years experience with major oil company in Process and Project Engineering, Construction and Operation of Gas Processing Plants, including Pipeline Facilities. Familiar with gas and products sales contracts. Supervisory experience. Desire position with medium size company, independent or contractor. Box K-286, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GEOLOGIST: Five years experience in San Juan and Paradox Basins. Desire to return there. Box K-281, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGICAL ENGINEER: Age 32. Presently DIRECTOR OF EXPLORATION for leading Independent. Can capably manage an Exploration and Developmental Program. Desire a salary-interest arrangement for family security. Box K-271, The Oil and Gas Journal, Tulsa, Oklahoma.

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Ralph R. Chatham has been named store manager at Freer, Tex., by Houston Oil Field Material Co. Harvey Gillespie, fishing tool supervisor at Williston, N. D., has been appointed district manager, Edmonton, Alta., Canada.

Warren J. Hollier has been promoted from district manager to assistant division manager, Casper, Wyo. Harold F. Streit has moved from Edmonton to Morgan City, La., as district manager. Ralph Thompson has been promoted from fishing tool supervisor to district manager, Casper.

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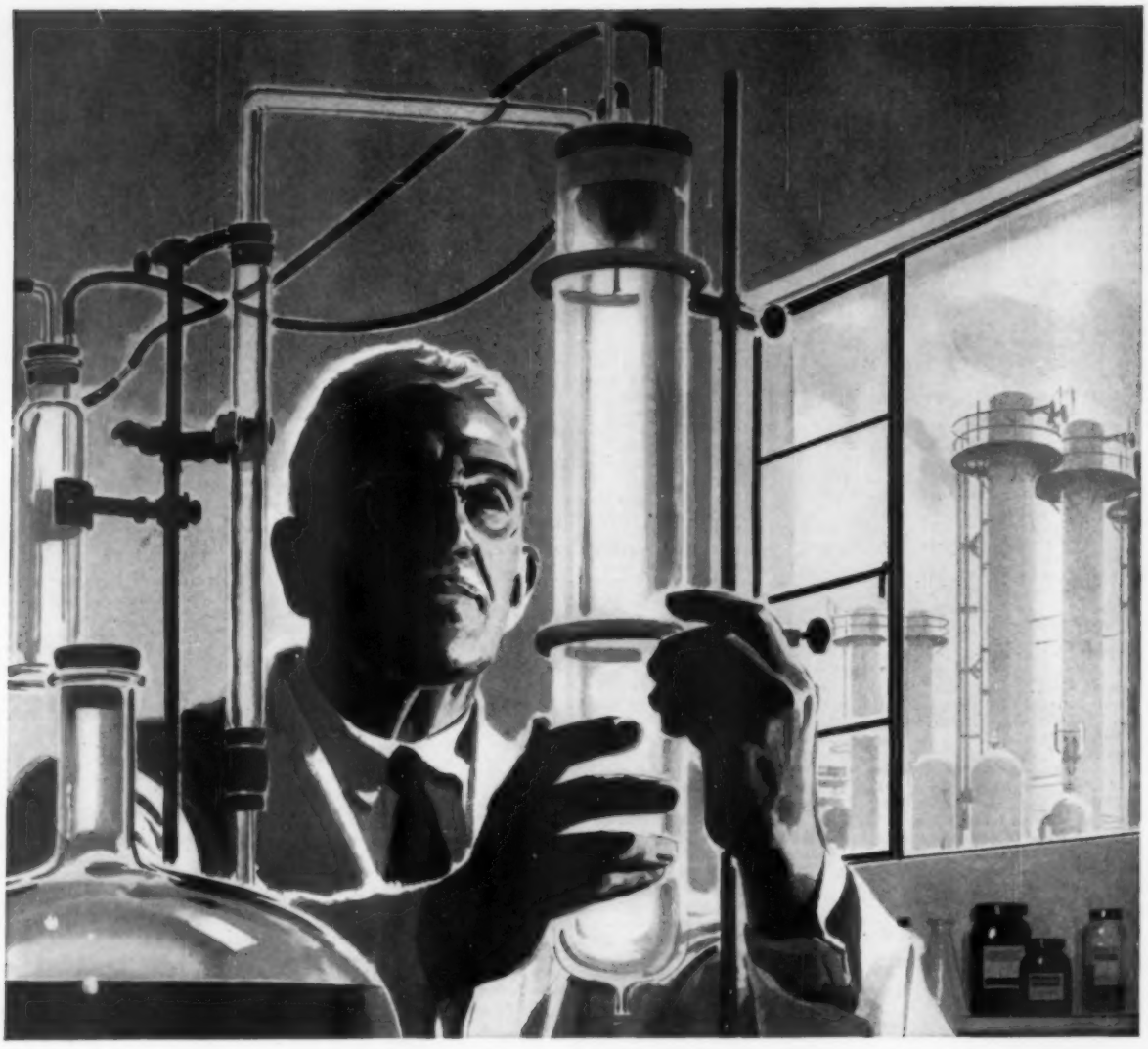

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